DOCUMENT RESUME

ED 098 069 88 SE 018 234

TITLE	Meet Me in St. Louie, Louie But Leave Your Car at Home (A Unit in Transportation). Environmental Ecological Education Project. Revised.
INSTITUTION	Missouri State Dept. of Education, Jefferson City.; Parkway School District, Chesterfield, Mo.
SPONS AGENCY	Bureau of Elementary and Secondary Education (DHEW/OE), Washington, D.C.
PUB DATE	Jul 73
NOTE	192p.; Page 76 missing from original document
EDRS PRICE	MF-$0.75 HC-$9.00 PLUS POSTAGE
DESCRIPTORS	Conservation Education; *Curriculum Guides; *Environmental Education; Environmental Influences; Instructional Materials; Learning Activities; *Secondary Education; Teaching Guides; *Transportation; *Units of Study (Subject Fields)
IDENTIFIERS	Elementary Secondary Education Act Title III; ESEA Title III

ABSTRACT

This unit, focusing on transportation, is designed to be utilized with junior high school students as an individual study. It has a minimum amount of teacher presentation and attempts to facilitate student learning about such topics as types of transportation in metropolitan areas, factors which determine the cost of a new automobile, laws governing licensing for both the car and the driver, ways of obtaining land for highway construction, pollution resulting from automobiles, job opportunities in the automobile industry, and the effect of increased use of the automobile on the American life-style. Although it is specifically constructed for use in the Parkway School District, Chesterfield, Missouri, it could be adapted for use in other junior high school settings. The unit includes the behavioral objectives and the expected student criteria for evaluation, pretests and posttests, a suggested instructional sequence, a bibliography of both student and teacher resources, and suggested student worksheets. (MLB)

ED 098069

U S DEPARTMENT OF HEALTH
EDUCATION & WELFARE
NATIONAL INSTITUTE OF
EDUCATION
THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

ENVIRONMENTAL ECOLOGICAL EDUCATION PROJECT

Parkway School District
Chesterfield, Missouri

DR. WAYNE FICK, Superintendent
VERLIN M. ABBOTT, Project Director

Unit: Meet Me in St. Louie, Louie but Leave Your Car at Home
(A unit in transportation)
Revised July, 1973

The work presented or reported herein was performed pursuant to a Title III ESEA Grant administered by the Missouri State Department of Education.

Jr. High

RECEIVED
OCT 1 1973

SE 018 234

MEET ME IN ST. LOUIE, LOUIE
BUT LEAVE YOUR CAR AT HOME

(A unit in transportation)

TEACHER ONLY

NOTE: It is suggested that one of the following be consumed before and following the unit on TRANSPORTATION!

GOLDEN CADILLAC

1 oz. liquore galliano

2 oz. white creme de cacao

1 oz. cream

(Place with small quantity of crushed ice in a blender. Use low speed for a short time. Strain into champagne glass.)

NOTE: We strongly urge you to substitute vanilla ice cream for the 1 oz. of cream. ¡Muy Bien!

CAUTION: Drinking may be hazardous to your health!

TABLE OF CONTENTS

	Page
SETTING	1
CONCEPTS	2-3
BEHAVIORAL OBJECTIVES	4-6
PRE-POST TEST	7-13
PRE-POST TEST ANSWERS	14-17
INSTRUCTIONAL SEQUENCE	18-78a
TEACHER BIBLIOGRAPHY	80-82
STUDENT BIBLIOGRAPHY	83-84
INDEX TO STUDENT WORKSHEETS	85-87
STUDENT WORKSHEETS	88-172

SETTING

This unit has been designed to be student-oriented.

It has a minimum of teacher presentation, utilizing the teacher's ability to work individually with those needing assistance instead of the teacher assuming the role as leader of mass education.

Each concept and behavioral objective is approached separately and student worksheets have been constructed that will allow the student to discover the concept's meaning for himself.

The worksheets located in the index, may be parceled out one at a time, but it is hoped that each student may work at his own pace with the teacher being called on only to disperse materials and for infrequent presentations.

Additional Ideas and Activities

Possible activities and resources that may be used will be found at the end of this unit, entitled, Environmental Resource Inventory. These inventory pages are arranged according to sepcific school sites. However, you will find that the idea or activity may apply to your building as well.

BEFORE BEGINNING THIS UNIT, IT IS ABSOLUTELY NECESSARY TO ORDER THE FOLLOWING FROM CENTRAL OFFICE (434-8412, ext. 79)

a. 1 copy of student handout #24 for each student
b. 2 copies of student handout #30 for each student
c. 1 copy of student handout #33 for each student
d. 2 copies of the pre/post test for each student
e. a classroom set of the Missouri Driver's Guide

CONCEPTS

TRANSPORTATION

I. Transportation is a necessary link between people and their work.

II. The St. Louis metropolitan area utilizes many types of transportation of which the most important are private automobiles, airplanes, trucks, and barges.

III. The primary mode of transportation in the Parkway area is the automobile.

IV. The cost of a new automobile is determined by the base price and individual options.

V. Insurance coverage is largely decided by the owner's insurance needs and the cost is determined not only by coverage chosen, but the area where the driver lives and the safety record of the driver.

VI. Local and state governments require licenses both for the car and the driver.

VII. Automobiles require continual maintenance to insure safety, proper performance, and licensing.

VIII. In the Parkway area, there are several arteries which link residential areas with the St. Louis metropolitan area.

IX. Many acres of valuable land have been condemned by various levels of government for use in the construction of highways.

X. Air pollution is increased by the exhaust fumes of automobiles.

XI. The automobile has increased noise pollution.

XII. The aesthetics of the roadside have been affected by the use of the automobile.

XIII. Many times, the use of the automobile has resulted in the destruction of property.

XIV. Increased use of the automobile has created problems which in turn have necessitated a study of alternatives for this dilemma.

XV. Rapid transit is one solution to the problem of congested highways.

XVI. Car pools offer an immediate solution to the problem of congested highways.

XVII. New power sources are being tested to minimize pollution and natural resource depletion caused by automobiles.

XVIII. To alleviate controversy between insurance companies, no-fault insurance has been introduced.

XIX. The automobile industry provides many job opportunities, especially in automobile production, sales, auto and highway maintenance, insurance, and licensing.

X. The automobile has changed the life style of most Americans.

BEHAVIORAL OBJECTIVES

TRANSPORTATION

1. Each student upon completion of this unit will, in a paragraph of not more than twenty-five words, explain why transportation is a necessary link between people and their work.

2. Every student will be able to write in one sentence how each of these important types of transportation is utilized in the St. Louis metropolitan area:

   A. Private automobiles
   B. Airplanes
   C. Trucks
   D. Barges

3. By citing figures from a neighborhood survey, each student will be able to choose the automobile as the primary mode of transportation in the Parkway area.

4. Ninety percent of the students will be able to demonstrate by means of a ten-option chart that the purchase price of a new automobile depends on the base price plus the owner's individual choise of options. (power windows, etc.)

5. A. Seventy-five percent of the students should be able to list four principal types of coverage offered by most insurance companies to fit an individual's automobile insurance needs.

   B. One hundred percent of the students will be able to list the three main factors that determine the cost of an individual's automobile insurance needs.

6. Ninety-five percent of the students will be able to outline or diagram the procedure required in obtaining both a car and a driver's license.

7. To insure safety, proper performance, and licensing, automobiles require continual maintenance. Seventy percent of the class should be able to label four parts of an automobile that require continual maintenance.

8. Eighty percent of the students will be able to locate and trace on a local map three of the four major arteries which connect the Parkway area with the metropolitan St. Louis area.

9. Seventy-five percent of the students will be able to write a definition (25 words or less) of "Eminent Domain" in explaining how land is acquired and used for highway construction.

10. All of the class will be able to interpret from a graph how air pollution is increased by the exhaust fumes of automobiles.

11. One hundred percent of the class will be able to write in three separate sentences the ways in which the automobile increases noise pollution.

12. By use of a sketch and one-sentence explanation, ninety percent of the class will be able to show how the automobile has damaged the aesthetics of the roadside.

13. Ninety percent of the students will be able to list at least three types of damage to property caused by the automobile.

14. Eighty percent of the class will be able to list four problems that have been brought on by the automobile and also list one alternative for each of these four problems.

15. Eighty percent of the class will explain in a four-sentence essay how rapid transit is a solution to the automobile problem.

16. Given a situation, ninety percent of the students will be able to conclude that car pools offer a solution to the crowded highways.

17. A. Eighty-five percent of the students should be able to list a new power source that is being tested to minimize pollution.

    B. Ninety-five percent of the students will be able to list five of the eight natural resources that have been directly or indirectly depleted by the automobile.

18. Ninety percent of the students will be able to list two arguments for and two arguments opposing no-fault insurance.

19. Given a list of occupations related to the automobile industry, eighty-five percent of the students will be able to classify said occupations into the three categories of: 1. Professional; 2. Skilled and Semi-skilled; and 3. Unskilled.

20. Ninety percent of the students should be able to list the drastic and subtle manner in which the social world of man has been altered by the automobile.

Note to Teacher:

On the very first day of class the transportation test is to be given. This is not a timed test. Most of the material covered in the test will be unfamiliar to the students. Therefore, inform the students not to be upset if they cannot answer many of the questions. They should be told that the purpose of the test is for the teacher to discover how well informed the students are about transportation. After completion of the unit, the same test is to be given. After scoring the test, the teacher should fill out the form found at the end of the unit.

NOTE: No question is to be counted correct unless the entire answer is correct.

TRANSPORTATION PRE-POST TEST

1. Explain in twenty-five words or less why transportation is a necessary link between people and their work.

2. Write in one sentece how each of these important types of transportation is utilized in the St. Louis metropolitan area:

   A. Private automobiles:

   B. Airplanes:

   C. Trucks:

   D. Barges:

3. In the Parkway area there are 45 buses, approximately 20,000 private automobiles, 5 taxi companies, 18,000 trucks, 427 airplanes. Based on this data, choose the primary mode of transportation in the Parkway area.

4. Fred Smith purchased a new car. Its base price was $3818.90. Fred selected:

   A. air conditioning
   B. radio (AM)
   C. vinyl top
   D. white walls
   E. undercoat
   F. power windows
   G. bumper guards
   H. floor mats
   I. body side molding
   J. power door locks

   Given the following options and their prices, how much did Fred's car cost?

Air conditioning	$405.00
Power windows	100.00
Tinted glass	50.00
White-walls (set of 4)	17.50
Wheel covers (set of 4)	26.00
Vinyl top	106.00
Vinyl interior	18.00
Body side molding	15.00
Remote control mirror	12.00
Bumper guards	36.00
Comfort steering wheel	44.00
Power door locks	69.00
Undercoat	24.00
Floor mats	12.00
Radio	65.00

5A. List four principal types of automobile coverage offered by most insurance companies.

A.
B.
C.
D.

B. From the list below, select the three main factors that determine the cost of an individual's automobile insurance policy.

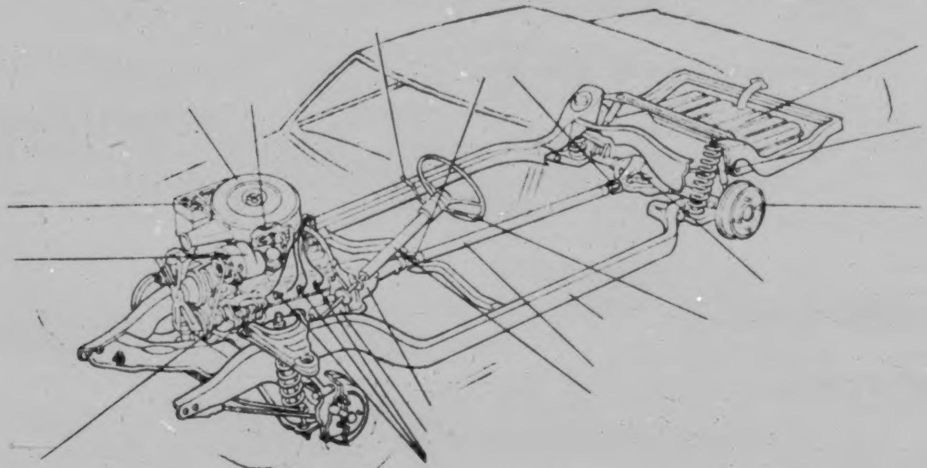
1._____color of car
2._____coverage chosen
3._____color of eyes
4._____father's occupation
5._____area where driver lives
6._____care of car
7._____driver's safety record
8._____school attended
9._____college degree
10._____passing of Mo. Constitution test

6. Outline the procedure required in obtaining a car license plate.
A.
B.
C.

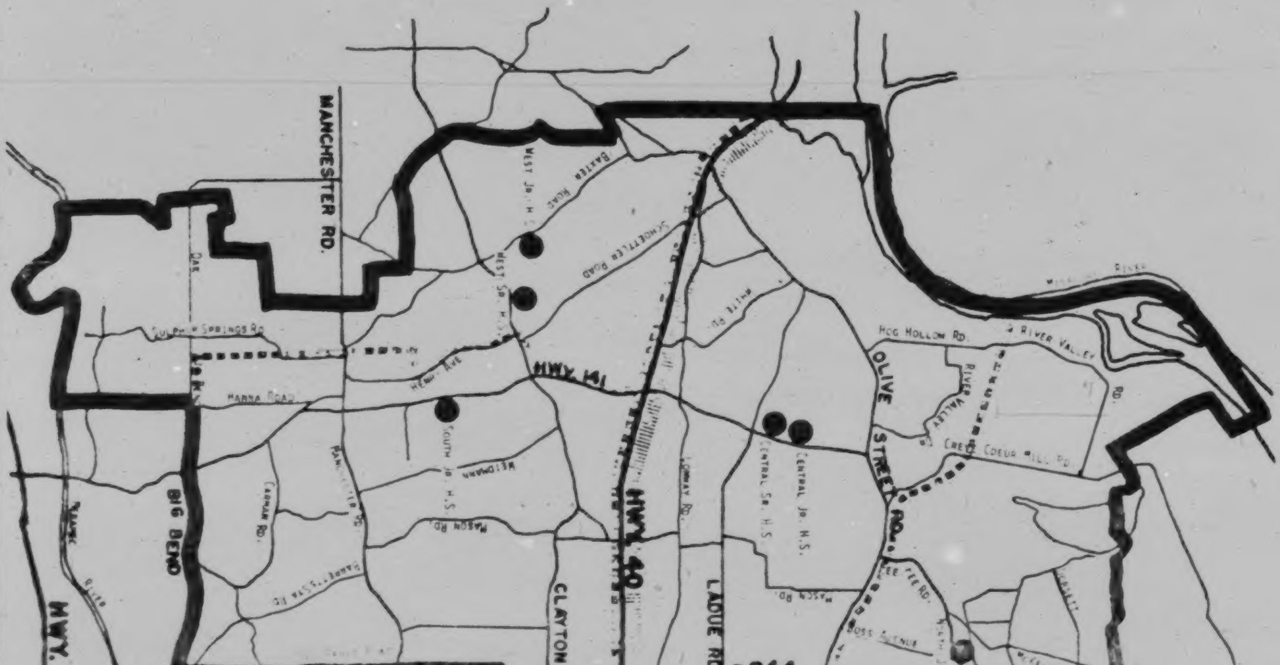
B. Outline below the steps necessary to obtain a driver's license in the State of Missouri.

7. Label four parts of an automobile that require continual maintenance.

THE MODERN AUTOMOBILE consists of many different parts, all of which work together to produce a quiet, efficient, and reliable vehicle.

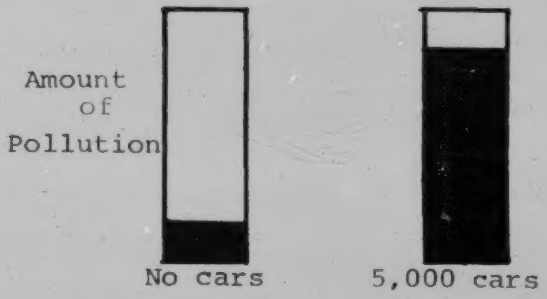


8. Locate and trace on the following map three of the major arteries which connect the Parkway area to the Metropolitan St. Louis area.



9. Land is required and used for highway construction. Write a thorough definition of "eminent domain" (use 25 words or less).

10. Interpret the graph below (in a three sentence explanation) to show how the automobile influences the pollution level.



11. Write in three separate sentences the ways in which the automobile increases noise pollution.

A.

B.

C.

12. In a sketch and a one-sentence explanation, show how the automobile has damaged the aesthetics of the roadside.

13. List three types of damage to private property caused by the automobile.

A.

B.

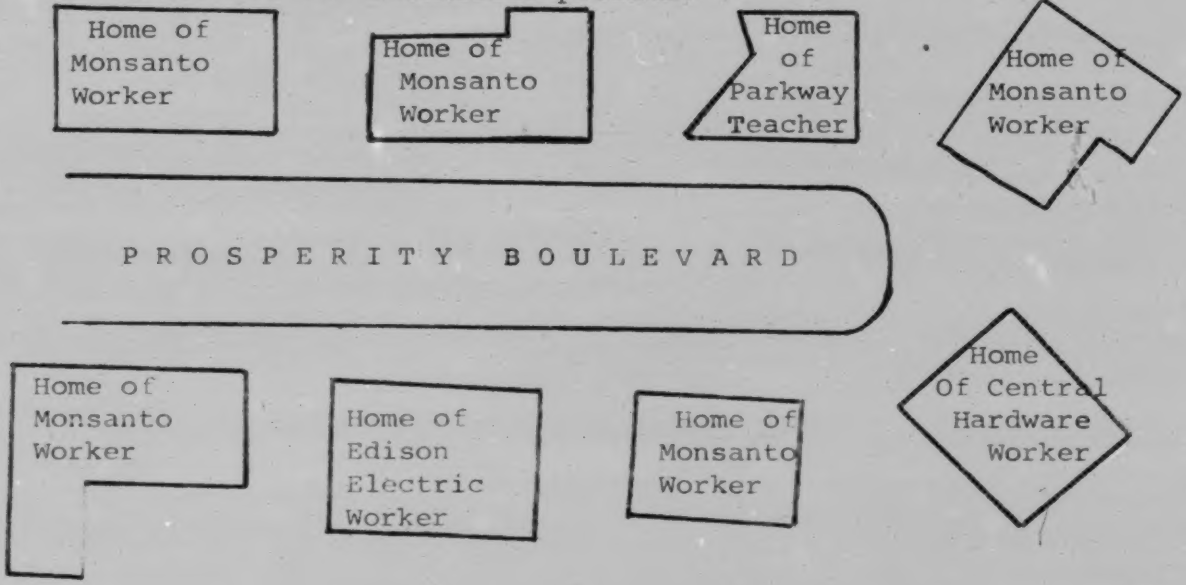
C.

14. On the chart below, list four problems that have been brought on by the automobile and also list an alternative for each.

Problem	Alternative
A.	
B.	
C.	
D.	

15. Explain in a four-sentence essay how rapid transit is a solution to the automobile problem.

16. Given the diagram below, show how car pools could offer a solution to the automobile problem.



17. A. Give a new power source that is being tested to minimize pollution.

B. Show by sketching eight natural resources that have been directly or indirectly depleted by the automobile.

18. List two arguments for and two arguments opposing no-fault insurance.

For	Opposing
1.	1.
2.	2.

19. Classify the occupations below into the following three categories:

1. Professional
2. Skilled or Semi-skilled
3. Unskilled

______highway commission engineer

______assembly line worker

______insurance adjuster

______automobile designer

______tune-up specialist

______car washer

______used car salesman

______service station worker

______owner of automobile agency

______die maker

20. List five "drive-in" facilities used by your family.

TEACHER ONLY

TRANSPORTATION PRE-POST TEST ANSWERS

1. Since people cannot physically live in the buildings in which they work or live within walking distance of the plant, they must rely on private or public transportation to get to their place of employment.

2. Private Automobiles: it is used as a means of transporting people from home to work.

   Airplanes: It is used for pleasure trips, business, mail service.

   Trucks: They deliver the bulk of food and other essentials.

   Barges: Tranporter of commodities, such as; petroleum, grain, coal, sand, and gravel.

3. The primary mode of transportation in the Parkway area is the automobile.

4. Base price...........$3818.90
   Options.............. 999.50
   Total price $4818.40

5A. A. Liability
    B. Collision
    C. Comprehensive
    D. Medical payment

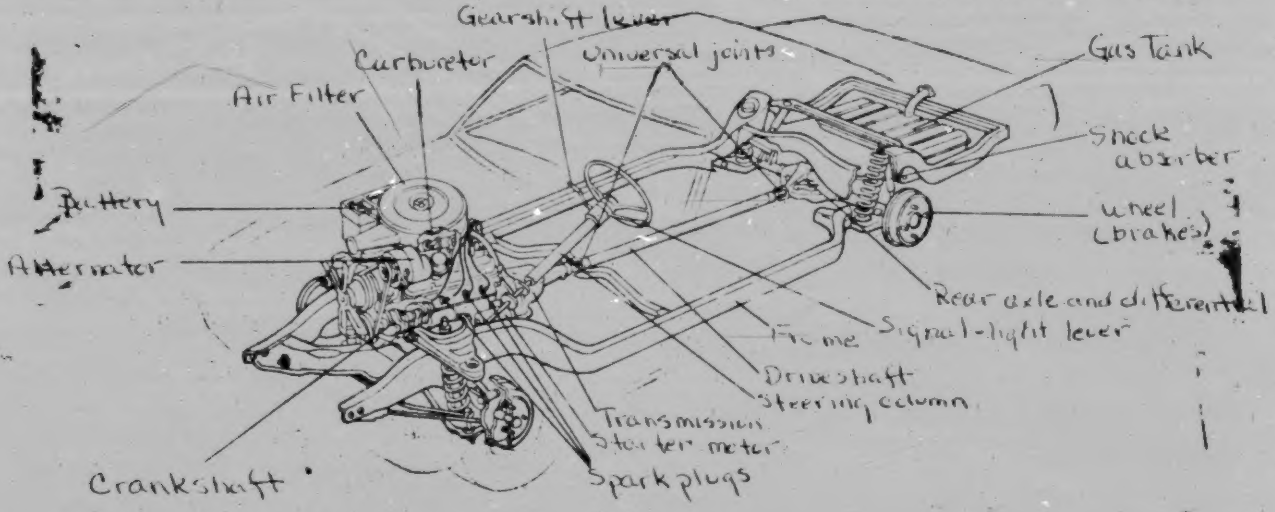
B. 1._____color of car
   2.__X__coverage chosen
   3._____color of eyes
   4._____father's occupation
   5.__X__area where driver lives
   6._____care of car
   7.__X__driver's safety record
   8._____school attended
   9._____college degree
   10._____passing of Mo. constitution test

6.A. A. Proof of ownership (car title)
     B. Receipt of sales tax
     C. Safety inspection
     D. Personal property tax receipt

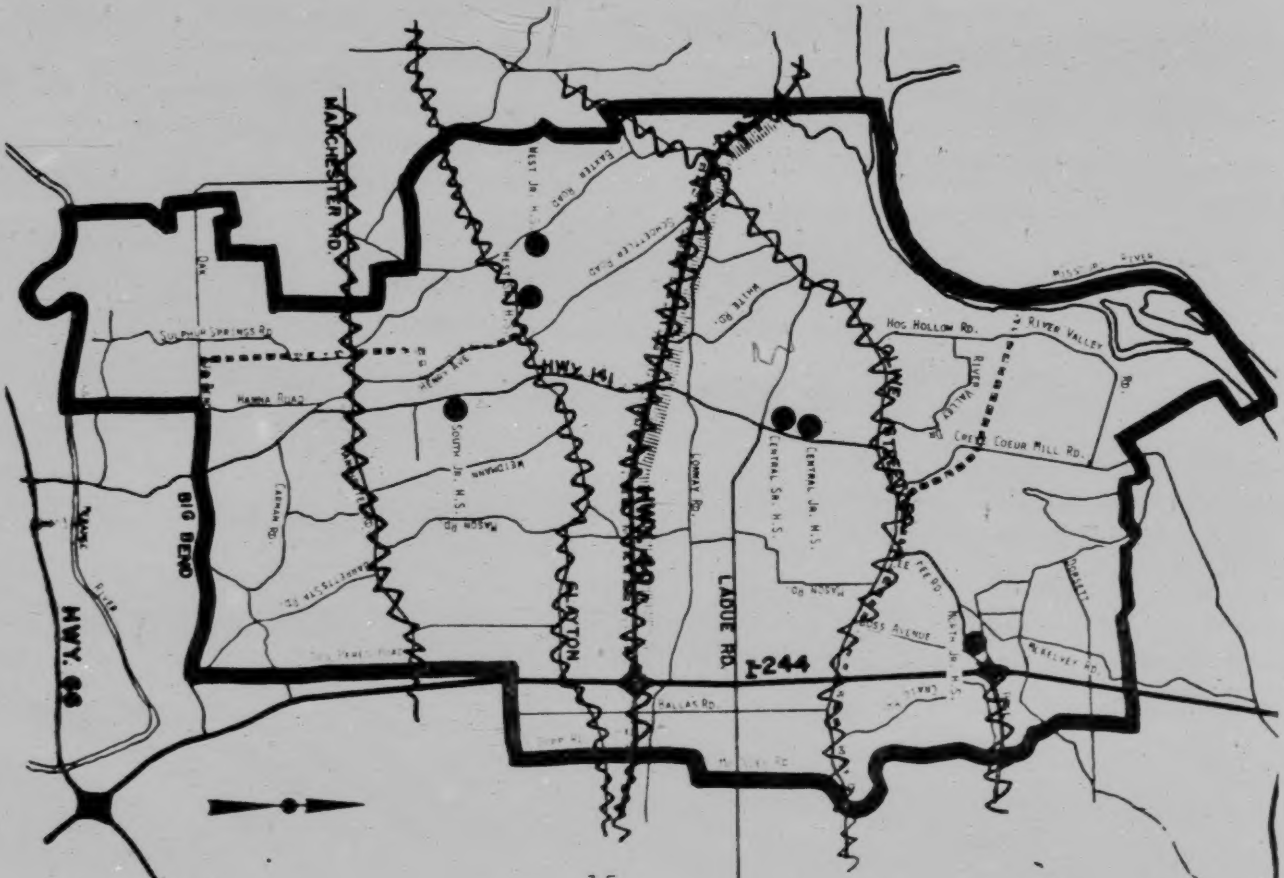
B. A. Written test
   B. Test of vision
   C. Actual driving Test

7. Label six parts of an automobile that require continual maintenance.

THE MODERN AUTOMOBILE consists of many different parts, all of which work together to produce a quiet, efficient, and reliable vehicle.



8. Locate and trace on the following map three of the major arteries which connect the Parkway area to the Metropolitan St. Louis area.



9. The right to take private property for public use provided the owner is given just compensation.

10. 1. Automobiles do contribute to air pollution levels.

    2. The amount of pollution from cars increases as the number of cars increase.

    3. Automobiles are one of the greatest contributors of pollution.

11. A. The volume of automobile production in our society is a contributor to increased noise levels.

    B. Shrubs, trees, etc, (good mufflers of sound) have been destroyed to make room for highways.

    C. Increased freeways, interstate highways, and other roadways are being built which contribute to increased volume of traffic near peoples' homes.

12. Students should show:
    1. litter
    2. erosion
    3. billboards
    4. loss of wildlife
    5. destruction of natural beauty

13. A. destruction to landscape
    B. damage to homes
    C. damage and destruction to lawn decorations
    D. Traffic signs, highway signs, highway medians, mailboxes, light standards, telephone poles

14.

A.	air pollution	better emission control devices
B.	noise pollution	better landscaping to muffle sound; rapid transit
C.	congested highways	rapid transit; car pools
D.	property damage	safer cars; better designed roadways; more careful drivers

15. It is a method of curbing rush-hour traffic jams.
It will help curb air pollution.
It will help curb noise pollution in our cities.
It will help alleviate the need for more and more roads and highways.
Less accidents should occur, thus lowering accident rates.

16. It would be better to form car pools in the neighborhood, rather than each individual driving to work.

17 A. Natural gas to replace gasoline

B. Show any of the following natural resources:

iron ore
limestone
magnesium
nickel
manganese
latex
coal
asbestos
cotton
copper
zinc
spruce trees
tin
bauxite
cork
vanadium
tungsten
zirconium
molybdenum
columbium

For

18. 1. inadequacy of compensation
2. inequities in the judicial system
waste of premium dollars

Opposing

1. how to recover loss of wages when injured
2. the law is silent as to premium reductions for electing any deductible.
provides for immunity against pain and suffering claims, but to limited extent.

19. 1 highway commission engineer
3 assembly line worker
1 insurance adjuster
1 automobile designer
2 tune-up specialist
3 car washer
2 used car salesman
3 service station worker
2 owner of automobile agency
2 die maker

20. Accept such answers as:
a. food carry outs
b. banks
c. grocery stores
d. cleaners
e. hamburger joints
f. theatres
g. automobile diagnostic centers

CONCEPT I

Transportation is a necessary link between people and their work.

BEHAVIROAL OBJECTIVE 1

Each student upon completion of this unit will, in a paragraph of not more than 25 words, explain why transportation is a necessary link between people and their work.

TEACHER BACKGROUND

Transportation may be defined as "the movement of an object, live or inanimate, from one place to another." It includes the simplest movements, such as a man walking across a room, as well as the most complex, such as the orbiting of a spacecraft around the earth. There is transport for the purpose of pleasure, as well as for commerce. Billions of dollars are spent annually on public and private transportation.

Human beings have personal and collective demands that can be satisfied only by transportation services. First, there is the problem of "getting to work." In pre-industrial society, the farmer lived at his place of work, and his only purpose of requiring transportation occurred when he had a surplus of crops to sell at the market. Also, the shopkeeper and the craftsman usually lived at their place of business and were not confronted with the problem of finding transportation to work. In the early industrial towns,houses were built within walking distance of the mill or mine so that no one was more than a few minutes walk from his place of employment.

However, this began to change in the 19th century. Farmers decreased in numbers and they looked increasingly to roads and railways to bring them seed, tools, and fertilizer and to carry away their produce. More dramatically, however, the problem of getting to work became more complicated with the growth of giant industrial, commercial, and financial centers. It became obvious that thousands of workers could not physically live in the buildings in which they worked or live within walking distance of the plant. The result of an industrialized society was the appearance of suburbs, metropolitan centers, and finally megalopolitan areas, in which the demand for private and public transportation was constantly present and continaully more difficult to satisfy.

For each improvement there are profound social consequences. Workers, seeking homes away from the noise and dirt of mills and factories, frequently settled in outlying areas. Little transportation hardship resulted since both private and public conveyances were available and not too expensive. This process of outward movement has continued today. The migration to the suburbs has been partly justified by the demands for a more satisfying and healthy environment; thus, today some workers live as far as thirty to fifty miles from their job, often devoting as many as three hours a day to commuting to and from work.

TEACHER PREPARATION

1. Prepare one copy of Student Worksheet #3 for each student in the class.

2. Six 10' sections of art paper for murals. (Paint, chalk, magic markers, or crayons or murals)

3. Film: "The Development of Transportation"
   St. Louis County Library (994-3300)
   11 minutes; black and white

STUDENT ACTIVITIES

1. The teacher will lead a discussion introducing the unit. The following questions should be discussed:

   A. What is transportation?
   B. What is transportation used for?
   C. What are some types of transportation?
   D. How has transportation changed?
   E. What will transportation be like in the future?

2. Student Worksheet #3, "Word Scramble," this may be a timed, take-home, or group activity.

3. Film: "The Development of Transportation"

4. Mural: Divide the class into five groups and ask for each group to create a mural on one of the following topics:

   A. What is transportation?
   B. What is transportation used for?
   C. What are some types of transportation?
   D. How has transportation changed?
   E. What will transportation be like in the future?

CONCEPT II

The St. Louis Metropolitan area utilizes many types of transportation of which the most important are private automobiles, airplanes, trucks, and barges.

BEHAVIORAL OBJECTIVE 2

Every student will be able to write in one sentence how each of these important types of transportation is utilized in the St. Louis Metropolitan area:

1) private automobiles
2) airplanes
3) trucks
4) barges

TEACHER BACKGROUND

Automobiles

More than 159 million automobiles are in use in the world today. Cars have been an accepted part of modern society and the most readily used means of passenger transport. The industry's output of passenger cars has been running between eight and nine million units a year. Among these millions of cars one has a choice of more than thrity different makes and at least 360 models. The total market for automobiles becomes bigger each year as the total population increases. Each year a new segment of the younger generation becomes old enough to own automobiles. Each year more people find they are making enough money to buy their first car. Each year more one-car families feel the need for a second car, and more two-car families buy a third car.

It is forecast that the population in the St. Louis Metropolitan area will increase from 2,300,000 in 1965 to almost 3,200,000 by 1990, which will result in sixty percent more trips being made on a typical weekday in 1990 than were recorded on a typical weekday in 1965. This increased travel demand will require substantial improvements to existing transportation facilities.

Airplanes

With its worth proven in World War I, the airplane was applied to commercial passenger and mail service in the between-war years, and it gained general acceptance as a means for transporting both men and good in World War II. Encouraged by a policy of government aid and subsidy and the expenditure of huge sums for military aircraft, the airplane has become the principal common carrier for intercity passengers in most industrialized countries. Business concerns increasingly operate aircraft for the use of their personnel, and small planes for private and pleasure uses are widely marketed.

Trucks

There are 13,000,000 trucks on the US highways, and fifty percent of the cities in the United States depend upon trucks to deliver the bulk of their food and other essentials. This situation is not expected to change appreciably in the near future. Trucking companies, faced with increased competition from air freight, will undoubtedly merge and expand until only transcontinental lines remain. These lines will rely increasingly on electronic data processing for scheduling, dispatching, and terminal management. Trucks in the future are also expected to be made larger and also faster.

Barges

Today, as of yesteryear, the Mississippi River is our major waterway, navigable from Minneapolis to Head of Passes at the Gulf of Mexico (1,837 miles). Its depth ranges from nine to forty feet, its width from 300 to 1,100 feet. It carried over 164 million tons in 1964, fully one-third the total of all inland waterways. Five principal commodities make up seventy-five percent of this traffic: petroleum and petroleum products; grain and grain products; coal; sand; gravel, and crushed stone, and iron and steel products.

TEACHER PREPARATION

1. For a field trip to the National Museum of Transport, the following information is provided:

    A) Educational groups must be scheduled in advance by telephone or mail; guides conduct all such trips; cancellation notice is required.

B) The cost is twenty cents for students and forty cents for adults.

C) The museum is open seven days a week throughout the year (10:00 a.m. to 5:00 p.m. Labor Day through May 29).

D) Address: 3015 Barrett Station Road
St. Louis, Missouri 63121
Phone: 965-6885

2. Alternative or additional field trips:

A) Trip to Manchester Fire House (Manchester Road and Henry Ave.) Contact Joe Baker, Fire Chief.

At this station one may see a fire engine made in 1908. Mr. Baker is available for questions of student interest.

B) Trip to Union Station. (General Mgr., 421-6600 sta. 414)

(Call in advance if such a trip is desired. It is possible for the students to take a tour of trains.)

C) Mrs. Gladys Hezel (1672 Red Bluff Court, Creve Coeur), a member of the Creve Coeur-Chesterfield Historical Society, is a good source for the early history of transportation in the Creve Coeur Area. She is a native of this area, as were her parents. She may be contacted by phone at 878-3142.

D) Mr. John F. Roeder (Executive Vice President, Creve Coeur Bank and Trust) is a good authority on early transportation, especially rail transportation. He provides good information on the train service linking Union Station to Creve Coeur in the early 1900's.

3. One copy of student worksheet #4 for each student (it is suggested that the teacher make at least twenty-five extra copies).

4. One copy of student worksheet #5 for each student(This is a follow-up activity from the National Museum of Transport trip. On one rail car there was a poster containing the poems of Casey Jones and John Henry).

5. Film: "Transportation Revolution"
   St. Louis County Library (994-3300)
   21 Minutes; color

STUDENT ACTIVITIES

1. Field trip to the National Museum of Transport.

2. Complete Student Worksheet #4, "Field Trip Worksheet"

3. Film: "Transportation Revolution"

CONCEPT III

The primary mode of transportation in the Parkway area is the automobile.

BEHAVIORAL OBJECTIVE 3

By citing figures from a neighborhood survey, each student will be able to choose the automobile as the primary mode of transportation in the Parkway area.

TEACHER BACKGROUND

In 1967 the principal means of intercity travel were as follows:

Private automobile	87.1%
Airlines	8.55%
Railroads	1.55%
Inland waterways	0.33%

A few statistics will show that Missouri also utilizes the automobile as the principal mode of transportation. In 1967 (according to the World Almanac) there were 2,405,521 car, truck, and bus drivers in the state. Furthermore, there were 2,084,755 registered autos, buses and trucks. In 1967, the City of St. Louis had a population of 750,026, while St. Louis County had a population of 703,532. The state had a population of 4,319,813. Thus, one may see that approximately one out of every two individuals in the state were drivers (car, bus or truck).

The licensing bureaus do not wish to give out information as to the numbers of registered vehicles that their offices have handled. However, if we use statictics as listed above, we would approximate that there are around 350,000 drivers in St. Louis County.

The State Highway Patrol gives approximately 450,000 visual tests each year. Since a driver has to have such a exam every three years, this department accounts for 1,350,000 drivers.

Missouri has approximately 32,000 miles of highways. Since 1917, the state has spent around one and one-half million dollars (not including maintenance) on improvements to help the motorist.

Most of the families today are becoming two and three-car families. In the Parkway area a much smaller number of people utilize public transportation than do the people in the city. Thus, one car is usually used for work, another for the wife to shop, etc., while yet another car may be used by a student to drive to school. This fact is illustrated by the number of parking spaces at the various secondary schools(note the large parking area at North Senior).

A traffic check will exemplify the numbers of cars owned by people in this area. Bottlenecks continually occur going to and from work. A simple observation of Woods Mill Road, Clayton Road, Olive Street Road, etc. will bring out this point. Furthermore, one may quite readily observe how few people use public transportation in these same locations.

TEACHER PREPARATION

1. Prepare a class presentation/discussion on the automobile. A suggested presentation is given below, but you may develop your own from the background material for this concept.

   Suggested Presentation: (Taken from Wheels,Time Life Books.

   More than any other people in history, Americans live on wheels. They travel an average of 5,000 miles per person per year, almost all of it in that fast, comfortable, convenient instrument, the family car. In fact, it sometimes seems that everything America does is in some way connected with automobiles. Virtually every baby born in the United States makes his triumphant return from the maternity ward in a car. Growing up, he rides to school in an automobile or bus. His food, his clothes, even the materials to build the house he lives in, roll into his life on a car or truck. As a teenager he pesters his parents to lend him the family's proudest possession for Saturday night dates. When he starts a regular job, there is an 82 percent chance that he will ride to and from work in a car. His recreation, whether it be a drive to town, like the suburbanites heading into St. Louis via Interstate 244 and Highway 40 on a winter evening, a vacation to the Rockies, or just a drive to the nearest lake, will almost certainly involve a motor vehicle. As his life progresses, he will allot 12½% of his expenditures and 13% of the space in his house to his car. And finally, there is the grim but inescapable fact that his last ride will be in the back of a rubber-tire hearse.

2. Prepare one copy of Student Worksheet #5 for each student. This will be used in an area of the discussion introduced in #1 of this preparation.

3. Prepare one copy of Student Worksheet #6 for each student. Prepare students for taking a survey of "How people get to work in Parkway." This survey may be taken either by an individual or a group.

   Each individual or group should poll ten people for their survey. The answers for the two questions should be written in tally form. To analyze the findings, total the answers to each question.

   After completing the totals of the survey, the student or group should write in one sentence the principal mode of transportation from home to work as used by his ten respondents.

4. Prepare one copy of Student Worksheet #8 for each student.

5. Films:

   A) "Automobiles, The Great Love Affair"
   County Library (994-3300) & Cooperating School Districts
   54 minutes; black and white

   B) "World of Henry Ford"
   Cooperating School Districts
   35 minutes; black and white

   C) "Auto-biography"
   County Library (994-3300)
   26 minutes; black and white

STUDENT ACTIVITIES

1. Teacher-lead presentation/discussion using student worksheet #6, "Facts and Dates of Automobiles."

2. Student Worksheet #6, "How People in Parkway Go to Work"
3. Student Worksheet #7, "Biography of an Automobile Magnate."
4. Films: Choice of three

CONCEPT IV

The cost of a new automobile is determined by the base price and individual options.

BEHAVIORAL OBJECTIVE 4

Ninety percent of the students will be able to demonstrate by means of a ten-option chart that the purchase price of a new automobile depends on the base price plus the owners individual choice of options. (power windows, etc.)

TEACHER BACKGROUND

By checking pre-test question #4, the teacher will find an example of the base price of a car with each option listed according to cost. The costs were based upon the quoted prices for a 4-door Chevrolet Impala, 1972 model. Don Essen Chevrolet (540 Manchester, Ballwin) provided the information.

TEACHER PREPARATION

1. In preparation for an automobile dealer's visit to the class, the teacher and students should prepare a set of questions which are to be asked in order that the speaker will cover the desired objective. Reference to the pre-test item will be of aid to the teacher. A student may act as secretary for the group, writing the particular questions on the board.

   Note: Make certain that base costs and options are thoroughly covered in your questions.

2. One copy of worksheet #8 for each student in the class.
3. One copy of worksheet #9 for each student in the class.
4. One copy of worksheet #10 for each student in the class.
5. One copy of worksheet #11 for each student in the class.
6. One copy of worksheet #12 for each student in the class.

ACTIVITIES

1. Presentation/discussion of Student Worksheet #9 "Automobile Glossary."

2. Visit by automobile dealer. (Audio-tape available at Central office, 434-8412, ext. 79)

3. Student Worksheet #9, "Comparison of Automobile Costs."

4. Student Worksheet #10, "Staying Within Your Budget While Buying a Car."

5. Student Worksheet #11,"Factors to Be Considered When Buying a Car."

6. Student Worksheet #12,"How Can a Car Be Purchased if the Buyer Doesn't Have the Cash Price?"

CONCEPT V

Insurance coverage is largely decided by the owner's insurance needs and the cost is determined not only by coverage chosen, but the area where the driver lives and the safety record of the driver.

BEHAVIORAL OBJECTIVE
5A

Seventy-five percent of the students should be able to list four principal types of coverage offered by most insurance companies to fit an individual's automobile insurance needs.

TEACHER BACKGROUND

By the late 1960's more than 100,000,000 automobiles were in use in the United States. Also, approximately $11,400,000,000 is annually paid for automobile insurance coverage. There has been a drastic increase in the number of insured drivers, from fewer than thirty percent in 1930 to nearly ninety percent by the mid 1960's.

There are two basic considerations in auto insurance: 1. the kind of vehicle being insured; and 2. the extent to which it is insured. The kind of vehicle being insured can generally be designated by one of three broad categories------------private passenger cars; public vehicles, such as taxicabs; and commercial vehicles, such as cargo-carrying trucks. While it is true that there are many specific forms of insurance protection that may be purchased for each category of vehicle, there are four kinds, which are:

1. liability
2. collision
3. comprehensive (storm, fire, vandalism, and theft)
4. medical payment

Liability insurance pays for damage to someone else's property or for personal injury to pedestrians, to occupants of another car or, in some instances, to occupants of the insured's car if it is involved in an accident for which the insured is judged legally liable.

Collision insurance will pay for damage to the insured car if it collides with another vehicle or object.

Comprehensive insurance will pay for damage to the insured car resulting from fire or theft and for glass breakage and damage resulting from many other causes such as storm or wind damage and vandalism.

Medical payment insurance pays for medical treatment for the policyholder or anyone else who is hurt while in the policyholder's car. Some types of medical insurance also protect the insured and his family while they are pedestrians, and protect pedestrians struck by the insured car.

TEACHER PREPARATION
5A

1. Guest speaker from an insurance company to speak to the class on the principal types of coverage offered by most insurance companies (Liability, collision, comprehensive and medical). The agent could help clear up questions concerning terminology found in automobile insurance policies. Information concerning a speaker may be obtained by contacting.

   Mr. Robert Healy, Broker
   Indianapolis Life Insurance Co.
   150 Weldon Parkway (63043)
   Phone: 432-1812

2. Prepare a home assignment (given verbally) that will ask the students to check their parents' automobile insurance policies to see if they have the types of coverage mentioned by the speaker. Also check as to additional coverage. This outside activity should be followed by a general class discussion.

STUDENT ACTIVITIES
5A

1. Guest speaker (insurance agent)

2. Verbal assignment of checking parents' insurance policies and group discussions of coverage purchased by parents. (This will be followed by class discussions)

CONCEPT V

Insurance coverage is largely decided by the owner's insurance needs and the cost is determined not only by coverage chosen, but the area where the driver lives and the safety record of the driver.

BEHAVIORAL OBJECTIVE
5B

One hundred percent of the students will be able to list the three main factors that determine the cost of an individual's automobile insurance needs.

TEACHER BACKGROUND

Rates are not the same among the various insurance companies. Competition is quite keen among the various "independent" companies and the "bureau" companies as to rates and coverage.

Determining the cost of automobile insurance is a never-ending task. Accident costs (based on semi-annual and annual reports) are combined with administrative costs of selling and servicing insurance to compute the rates that companies charge for the protection they sell. There are various ways to determine rates which companies charge the policyholders; however, the following factors are usually considered:

1. age
2. sex
3. marital status
4. automobile use
5. type of auto
6. autos covered by single policy
7. driver's record
8. driver training
9. locale
10. student's grades
11. number of years driver is licensed.

To insure "fair play among all policyholders," most companies divide car owners into a number of groups, based on the probable accident rate for each group. Based upon these computations, the companies have found that the lowest rates are accorded to good drivers with good records who are over 29 and under 65 years old, who do not use their cars for business, and whose cars are not driven by unmarried males under the age of 25. In contrast, the highest rates are paid by unmarried males under the age of 21 who are the principal operators of the vehicle.

Finally, the public overlooks a vital fact in the increasing cost of automobile insurance. It (the public) determines the rate of insurance through its record of accidents and accident losses. The insurance companies relate these statistics to the net cost of protection against loss. Of course, the companies add a figure for overhead (Which includes profit) to determine the final cost of the policyholder's premium.

> Note: Missouri law does not require automobile drivers to have any kind of insurance---collision, liability, or comprehensive. The only exception would be as follows: if a driver loses his license because of an accumulation of 12 points for various violations in a 12-month period, then he must (in order to get his license re-newed) purchase liability insurance for a period of three years. Also, if an individual has no liability insurance and is involved in an accident, then he may to to jail.

TEACHER SUPPLEMENT
5B

WHY ARE AUTO INSURANCE COSTS SO HIGH?
Prepared by Robert Healy (Indianapolis Life Insurance Co.)

Factors determining auto insurance rates:

1. Locality (includes environmental conditions)
2. Age of Operators
3. Driving Experience
4. Accidents and Violations
5. Type of Auto
6. Use of Auto
7. Social Conditions

8. Repair Costs

9. Settlement Cost and Number of Claims

10. Economic Conditions

All of the above factors have an affect on your insurance costs but the factors that have the most influence in determining the rates are number 1, 2, 3, and 4.

Before we go into detail of the importance of these factors, let's look into the significance of the other six.

Factor No. 5 - Type of Auto

This should be pretty apparent. It's obvious that it's going to cost more to insure an $8500.00 auto as opposed to a $4000.00 auto. Assuming both autos were stolen or involved in a total collision, the insurance company must pay more than double the price of the $4000.00 to take care of the more expensive car.

High performance autos are also rated higher. Its been irrefutably proven that these autos are involved in more than their share of severe and fatal accidents.

Factor No. 6 - Use of Auto

If an auto is driven to and from work or school, it is rated higher than if it were used for pleasure use only. It is rated still higher if it is used in a business such as a salesman who is in and out of his car all day.

The rates are also higher for the youthful operator who has a car at his disposal at all times as opposed to the youthful operator who only has occasional use of the family auto.

Factor No. 7 - Social Conditions

A permissive social climate invariably leads to more insurance claims. Acts of vandalism run rampant. There seems to be no rhyme or reason or it. Rocks thrown through windshields--scratched paint jobs--torn off antennas--slashed tires, etc.

Another prevalent attitude is--"What's the big deal!? So I had an accident. Mom and Dad will get over it in a couple of days."-- and usually they do.

Factor No. 8 - Repair Costs

A union repair shop in the metropolitan area usually charges $10.50 per hour for labor. In a non-union shop in a small town it might be as little as $5.00 an hour.

Factor No. 9 - Settlement Cost and Number of Claims

For the last 15 years court juries have been awarding higher and higher settlements for bodily injury claims. In many instances, the higher award is justified. However, most of the time the settlement is much higher than the actual situation warrants.

In years gone by, jurors strongly tried to first determine whether or not the defendant was actually legally responsible for the accident caused by his imprudent driving. If they found he was responsible, they would then try to determine an honest dollar value for the pain, suffering and financial loss suffered by the injured person.

The current trend for most juries today is to ignore legal facts as to whether or not the defendant was legally responsible and just get on to how much the injured party is to be awarded.

Factor No. 10 - Economic Conditions

This is simple--if the country is in a continued inflationary spiral, insurance costs are going to go up. If grocery costs are going up every week, your insurance rates will ultimately increase also. If repair shops hourly labor rates go up, so will your insurance cost, and on and on.

All of the above factors will affect your auto insurance costs to some extent--but now let's get to the factors that most affect your rates.

Factor No. 1 - Locality (Includes environmental conditions)

There are many different rating territories in the state of Missouri. These rates run from a high of innercity St. Louis to the low of St. Joseph, Missouri.

Below is the cost of auto insurance for three different rating territories using what is commonly called base rates. To these rates, various surcharges or credits are applied which we will get into later. The base rates are those used by approximately 75% of the companies doing business in the state. For the exceptionally good risk, the base rate is reduced.

Example:

1971 Chevrolet Impala 4 Door

Coverages	Inner-City	Creve Coeur	St. Joseph
$50/100,000 Bodily Injury	$ 93.	$ 77.	$ 58.
$10,000. Property Damage	45.	41.	33.
Comprehensive	56.	33.	20.
$100 Deductible Collision	101.	65.	41.
Totals	$295.	$216.	$152.

Why are the inner-city rates so high? Let's think about it. Where is the highest congestion of traffic during rush hours? (Exclusive of Hwy. 40) While many live in the county who cause this congestion, most live in the city.

How many cars do you see parked on city streets at night as opposed to being in a driveway or garage? Cars parked in the street are subject to damage by drunken drivers, vandals and thieves.

Where do you find the highest occurance of vandalism and thievery? The Inner-City.

O.K. That's why inner-city rates are so high--but why are Creve Coeur rates so much lower, especially when the country drivers usually have to drive further to work? The theory and statistical findings are these:

1. Usually the county resident has shown more responsibility than many of his city counterparts. They have worked hard, saved their money, bought a nice home and a couple of cars. They have more respect for one another and their property. They don't want to lose all these things by being in a serious auto accident and possibly not having adequate bodily injury limits.

2. They are usually driving in less congested areas.

3. Their cars are parked in driveways or garages.

4. Less vandalism and theft losses.

Factor No. 2 - Age of Operator

Now we begin to get into the surcharges which are applied to the base rates as previously outlined. The base rate always takes the factor of 1.00, from this point we add the various surcharges or credits.

As an illustration we are going to use a single male operator who has unrestricted use of an auto, but drives less then three miles to school or work and has had no accidents or violations. Creve Coeur base rates.

Age	16	Factor	3.90	X	$216.	=	$842.
Age	20	Factor	2.85	X	216.	=	615.
Age	25	Factor	1.90	X	216.	=	410.
Age	30	Factor	1.00	X	216.	=	216.

Again it must be pointed out that these are base rates. If there is more than one auto being insured, a 15% credit is allowed. If a student maintains a "B" average he can qualify for up to a 25% credit.

Factors No. 3 and 4 - Driving Experience and Accidents or Violations

As a rule, insurance companies will surcharge the base rates until an operator has had 2 years driving experience. A 10% credit is allowed for the completion of an accredited driver's training course.

An important thing a young operator must keep in mind is that his driving experience will greatly affect the cost of their insurance for many years. If they maintain a clean record, their insurance cost will be reduced 10 to 15% every year. If on the other hand they have a couple of chargeable accidents, the cost will go up substantially and will stay high for three years.

Example:

Using Creve Coeur base rates, we have two young men age 18. One has a clean record, the other has had two chargeable accidents. They both drive to school less than three miles.

	No Accidents	Two Accidents
Base rate	$216.	$216.
Factor	3.30	4.20
Totals	$713.	$907.

If the clean risk is a "B" average, his factor is 2.50 for an annual cost of $540. A substantial saving.

As a rule of thumb, the rates for the youthful female operator is approximately 50% of that charged for the youthful male operator.

A combination of both accidents and violations will put your insurance cost out of sight.

In summation, it must be pointed out that there are 265 different rating factors to fit the individual case. The driver and the use of the car determines what factor is going to apply to their specific driving rate.

Keeping this in mind, it really boils down to the fact that the driver himself has the most pronounced affect as to what his insurance cost will be now and in the future.

TEACHER PREPARATION
5B

1. One copy of Student Worksheet #13 for each student.
2. One copy of Student Worksheet #14 for each student.
3. One copy of Student Worksheet #15 for each student.
4. One copy of Student Worksheet #16 for each student.
5. One copy of Student Worksheet #17 for each student.
6. One copy of Student Worksheet #18 for each student.
7. One copy of Student Worksheet #19 for each student.*

STUDENT ACTIVITIES
5B

1. Using Student Worksheet #13, "Factors Entering into Cost of Insurance" students will work in groups discussing insurance costs.
2. Student Worksheet #14, "How Much will Automobile Insurance Cost You?"
3. Student Worksheet #15, "How Insurance Rates Vary According to Locale:.
4. Student Worksheet #16, "How Much Does Automobile Liability Insurance Cost?"
5. Student Worksheet #17, "What is Collision Insurance?"
6. Student Worksheet #18, "Can a Car be Insured Against Damage not Caused by Collision?"
7. Student Worksheet #19 "The Case of the Deceitful Driver".

* Contact insurance company to determine how incorrect information on application for car insurance is handled.

CONCEPT VI

Local and state governments require licenses both for the car and the driver.

BEHAVIORAL OBJECTIVE 6

Ninety-five percent of the students will be able to outline or diagram the procedure required in obtaining both a car and a driver's license.

TEACHER BACKGROUND

In 1952, the Sixty-Sixth General Assembly passed legislation which provided for a driver examination program to be established in our state. The general administration of the law is the responsibility of the Director of Revenue who has delegated the responsibility of conduction of the examination to the Highway Patrol. Complete driver examinations are given to new drivers, new residents, drivers who allow their license to expire more than 60 days, and persons cited by the director. An applicant for the renewal of a Missouri driver's license is given a vision test by the Department of Revenue at the time application is made.

Every motor vehicle or trailer which is operated or driven upon the highways of the state, unless exempted by the law, must be registered. Every motor vehicle purchased and held in possession must be registered immediately. If application for the certificate is not made within thirty days after the vehicle is acquired by the applicant, a delinquency penalty fee of five dollars for each month or part of a month of delinquency, not to exceed a total of twenty-five dollars, shall be imposed. No state registration license to operate any motor vehicle shall be issued unless:

1. The application is accompanied by a tax receipt or a statement certified by the applicant's county or township collector that the applicant's state and county tangible personal property taxes for the preceding year have been paid or that no such taxes were due.

2. The applicant must furnish proof of ownership (title). (also, receipt of sales tax on car)

3. Safety inspection

TEACHER PREPARATION

1. Order a classroom set of "Missouri Driver's Guide" from Central Office (434-8412, ext. 79)
2. Prepare one copy of Student Worksheet #20 for each student.
3. Prepare one copy of Student Worksheet #21 for each student.
4. Prepare one copy of Student Worksheet #22 for each student. (The students will review this worksheet before viewing the slides)
5. Obtain from the Central Office the set of slides entitled, "Uniformed Traffic Control Devices." The slides are concerned with the old and new traffic signs. Credits for the slides are:
    a. American Society of State Highway Officials
    b. Institute of Traffic Engineers
    c. National League of Cities
    d. National Committee on Uniform Traffic Laws
    e. National Association of Counties
6. Prepare one copy of Student Worksheet #23 for each student.
7. When showing slides, use the following script:

Slide 1. This slide shows two of the uniform sign manuals which have been used in the U.S. The manual on the left is the 1935 edition, the manual on the right is the new 1971 manual.

Slide 2. The following dates have been set as goals for the new signs and signals.

Slide 3. The following standard colors have been adopted.

Slide 4. Old signs were often vague and hard to read.

Slide 5. Formerly many signs were all the same color and shape.

Slide 6. Different shaped signs are being used for various regulations.

Slide 7. Two signs depicted are the options available for certain regulations.

Slide 8. No comment needed.

Slide 9. Note the new sign on the top and the old on the bottom.

Slide 10. - 18. No comments needed.

Slide 19. New color for STOP sign shows up brighter and therefore can more easily be seen.
Slide 20. The new electric stop lights are longer and are uniform in position in order to aid the colorblind.
Slide 21. Pedestrian signs are also longer and easier to read.
Slide 22. No comment.

8. Contact the counseling office of one of the senior high schools for the purpose of setting up a field trip to their Driver Education Department. (Central Senior High - 434-4700) (West Senior - 227-2300) (North Senior High - 878-6000)

9. Free literature on driver education and traffic signs may be obtained from:

   Automobile Club of Missouri
   3917 Lindell
   St. Louis, MO 63108 (phone: 553-2233)

10. Films:

    "National Drivers Test"
    Cooperating School Districts
    48 minutes; black and white

    "Highway Driving"
    St. Louis County Library
    17 minutes; black and white (994-3300)

    "Driving in the City"
    St. Louis County Library
    10 minutes; color (994-3300)

STUDENT ACTIVITIES

1. Class discussion from Student Worksheet #20. "Missouri Driver's Guide Questionnaire" use "Missouri Driver's Guide" (available from Central Office, 434-8412, ext. 79)

2. Student Worksheet #21, "Missouri and the License Plate."

3. Student Worksheet #22, "Background Information for Slides Pertaining to the 1971 MUTCD." (Manual on Uniform Traffic Control Devices)

4. Student Worksheet #23, "Designing Graphic Road Signs."

5. Have the class hold an oral evaluation of their visit to the Driver Education Department.

6. Films:

   "National Drivers Test"
   "Highway Driving"
   "Driving in the City"

CONCEPT VII

Automobiles require continual maintenance to insure safety, proper performance, and licensing.

BEHAVIORAL OBJECTIVE 7

To insure safety, proper performance, and licensing, automobiles require continual maintenance. Seventy percent of the class should be able to label four parts of an automobile that require continual maintenance.

TEACHER BACKGROUND

The vehicle safety inspection law was enacted by the Seventy-fourth General Assembly and became effective January 1, 1969. The inspection law requires every owner to submit his vehicle to an inspection of its mechanism and equipment and obtain a certificate of inspection and approval prior to the registration of the vehicle.

To provide an opportunity for vehicle owners to obtain inspections with a minimum of inconvenience several thousand automobile service agencies and skilled mechanics have been licensed throughout the state.

TEACHER PREPARATION

1. Prepare one transparency and class-size quota of Student Worksheet #24 (order from Central Office). This transparency will be used as the teacher and class label the worksheet.

2. Teacher should familiarize himself with material in teacher background for this concept and introduce Student Worksheet #25.

   Prepare one copy of Student Worksheet #25 for each student.

   Ask the students to spotcheck one of their family cars using the check list.

3. One copy of Student Worksheet #26 for each student.

4. One copy of Student Worksheet #27 for each student.

5. One copy of Student Worksheet #28 for each student.

6. One copy of Student Worksheet #29 for each student.*

7. Films: "What's under Your Hood?"
   Cooperating School Districts
   11 minutes; color

   "Electronics Technician"
   Cooperating School Districts
   11 minutes, color

STUDENT ACTIVITIES

1. Student Worksheet #24, "The Parts of an Automobile"

2. Student Worksheet #25, "Safety Inspection Checklist"

3. Student Worksheet #26, "Crossword Puzzle on Automobile Glossary."

4. Student Worksheet #27, "What Are the Actual Costs of Operating an Automobile after It is Purchased?"

5. Student Worksheet #28, "How Do Repairs and Upkeep Affect the Cost of Operation?"

6. Student Worksheet #29, "In Depth Activities on Automobiles."

7. Films: "What's under Your Hood?"
   "Electronics Technician"

* Also refer to Page 194 for a narration on activity 1.

CONCEPT VIII

In the Parkway area, there are several arteries which link residential areas with the St. Louis Metropolitan area.

BEHAVIORAL OBJECTIVE 8

Eighty percent of the students will be able to locate and trace on a local area map three of the major arteries which connect the Parkway area with the Metropolitan St. Louis area.

TEACHER BACKGROUND

1. Refer to the vocabulary pertinent to this concept. (This is found on worksheet #2)

2. Review the map of the local area found in the unit.

TEACHER PREPARATION

1. Prepare a class presentation/demonstration of the vocabulary for concept VIII (this vocabulary is found on Student Worksheet #2). The student should know that the main arteries which connect the Parkway area to the Metropolitan St. Louis area are: Highway 40, Manchester, Page, Olive and Clayton.

2. *Using the Metropolitan St. Louis Area Maps: (Student Worksheet #30)

    A. Prepare two copies for each student.
    B. Prepare a transparency for classroom work.

3. *Prepare one copy of Student Worksheet #31 for each student.

4. Prepare one copy of Student Worksheet #32 for each student.

5. Prepare one copy of Student Worksheet #33 for each student.

* Available from Central Office (434-8412, ext. 79)

STUDENT ACTIVITIES

1. Class discussion on artery, secondary, and collector streets using Student Worksheet #30.
2. Student Worksheet #31, "Word Scramble"
3. Student Worksheet #32, "Locating the Arteries that link Parkway with St. Louis"
4. Student Worksheet #33, "Parkway Area".

CONCEPT IX

Many acres of valuable land have been condemned by various levels of government for use in the construction of highways.

BEHAVIORAL OBJECTIVE 9

Seventy-five percent of the students will be able to write a definition (25 words or less) of EMINENT DOMAIN in explaining how land is acquired and used for highway construction.

TEACHER BACKGROUND

Eminent Domain is the right of government to force the sale of private property for public use. In Great Britain and Canada it is called the right of expropriation. In the United States both state governments and the federal government have the right of eminent domain. However, this right is delegated frequently to local or city governments or sometimes to private utility firms, such as railway or telegraph companies. In condemnation proceedings to establish eminent domain it is necessary to show that the property will be used as the site for such public needs as libraries, parks, highways, railroad rights-of-ways, telephone and telegraph lines, and public water-works and sewers.

Eminent domain is the inherent right of a sovereign power and does not need to be supported by a written law. The United States Constitution, however, prohibits both the states and the federal government from exercising their power of eminent domain without making just compensation to the property owner. The amount of compensation to be paid is usually set by a court but may be appealed to a committee of realtors, It is determined on the basis of the loss to the property owner, or seller. Citizens whose lands are taken away may appeal rulings of the court.

TEACHER PREPARATION

1. One copy of Student Worksheet #34 for each student.

2. Have the students read the case, decide the issue and decide which sections of the Bill of Rights are pertinent.

3. The following analogous situations (especially the last one) might be useful in discussions:

a. A strip of land along the front of the motel is taken, leaving access to the outer road.

b. A strip of land is taken along the front of the motel, leaving access to the outer road, but completely destroys the motel's lawn, shrubs, and trees to within a few feet of the building.

c. This situation is the same as #b except that instead of having to drive three miles along the access road either way to get onto the highway, the access point to the highway is only 100 yards down the outer road.

d. A New York man sued the state because the interstate highway built next to his property caused him mental strain and disturbed his peace when the heavy commercial truck traffic came by his property at all hours of the day. Would you pay him?

4. Establish criteria for determining what SHOULD BE compensated for by the state in exercising eminent domain. In so doing, consider the following:
   a. sentimental considerations such as removal of a graveyard
   b. things which cannot possibly be replaced such as historical sites.
   c. business built up over a period of time
   d. underground mineral deposits
   e. natural forests
   f. cost of re-location
   g. pollution of one's environment with noise, as a nearby road

STUDENT ACTIVITIES

1. Discussion (in depth) of Student Worksheet #34.

CONCEPT X

Air pollution is increased by the exhaust fumes of automobiles.

BEHAVIORAL OBJECTIVE 10

All of the class will be able to interpret from a graph how air pollution is increased by the exhaust fumes of automobiles.

TEACHER BACKGROUND

Pollutants from the automobile include five principal gases and chemicals: carbon monoxide, sulfur dioxide, unburned hydrocarbons, various oxides of nitrogen, and lead compounds. These substances react to sunlight, changing into the compounds that produce smog. Most harmful among them are ozone, which kills plants and deteriorates many fabrics; peroxyacetyl nitrate, which irritates eyes and gives smog its odor; and nitrogen dioxide, which damages lung tissue.

According to a 1969 US Senate Commerce Committee report, more than 60% of the air pollution in the United States is caused by the automobile. In some urban areas it reaches 85%. Some 200 million tons of atmospheric pollutants come from exhaust pipes each year-----virtually two tons per car on the average.

The very principle of the internal-combustion engine (I.C.E.) makes it a polluter. The I.C.E. uses brief explosions of mixed fuel and air to hammer the pistons downward. At highway speeds, about 20,000 such explosions take place each minute. An explosion is an inefficient way to burn fuel. When the flame front, touched off by the spark plug, moves rapidly outward, it is partly quenched on reaching the relatively cool cylinder walls. As a result the fuel is incompletely burned. When the exhaust valve opens, the undesirable combustion products are forced out into the atmosphere. Furthermore, engines are designed so that, for extra power, the fuel-air mix is rich in gasoline, making combustion even less complete.

There are at least five ways that emissions may be controlled from automobiles and smokestacks:

1. remove the process or equipment
2. change the fuel or other material being used
3. changes in operating procedure
4. tail-end converter of pollutants
5. tail-end collector of pollutants

On October of 1965, the Clean Air Act was amended to permit national regulation of air pollution from new motor vehicles. The first standards were applied to 1968 models. These standards were tightened for 1970 and 1971 model cars. And even more stringent standards have been announced for 1973 and 1975.

The first standards set under the 1965 Amendments to the Clean Air Act applied to 1968 model vehicles. These standards require complete control of crankcase hydrocarbons and partial control of exhaust hydrocarbons and carbon monoxide.

In June of 1970 the Secretary of HEW proposed sweeping changes in the procedures for testing cars when it was discovered that the existing procedures really underestimated the amount of pollution being emitted. At the same time, the Secretary confirmed the same 1975 standards for hydrocarbons and carbon monoxide and said that the nitrogen oxide and particulate standards proposed in February of 1970 would be confirmed as soon as test procedures for these standards had been developed.

The first surveillance data on production line cars subject to the Federal standards were reported in the summer of 1968. On the whole, the data showed that cars complied with Federal standards. By 1969, however, data showed that hydrocarbon emissions of 1968 cars ran about twenty percent above the standard and carbon monoxide about eight percent above. By 1970 hydrocarbons were higher by 25 percent and carbon monoxide by about ten percent.

Failure of cars to perform more adequately according to standards set forth are both administrative and legislative. Even if proper safeguards are met, many automobiles will not meet the standards because of systems breaking down and car owners who do not provide proper maintenance.

The data on present levels of pollution in our urban environment, the projected increase in urban traffic in the years ahead, and the performance of pollution control systems under actual driving conditions make it clear that even applying stricter standards in 1975 will only prolong the downward curve in vehicle emissions until the middle 1980's. After that, carbon monoxide levels will again rise because of the sheer number of automobiles on the roads and highways.

The key additive from an air pollution control viewpoint is tetraethyl lead in gasoline. It accounts for a significant portion of the particulate pollution from automobiles. A panel of the Commerce Technical Advisory Board concluded that lead-free gasoline should be ready within the next few years so that industry will have the chance to roadtest these catalytic devices.

An alternative to the internal combustion engine may be necessary if it cannot meet the increasing stiff standards. The President announced in his environmental message (Feb., 1970) a program to develop one or more alternatives within five years.

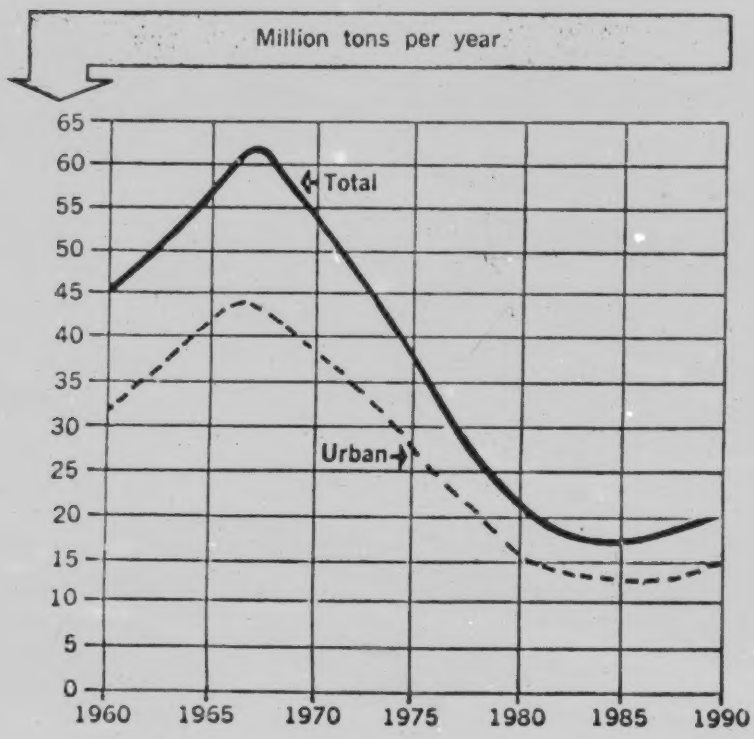
He called for:

1. An extensive research and development program to be conducted under the general direction of the Council on Environmental Quality.
2. An incentive program to private developers, through Government purchase of privately produced unconventional vehicles for testing and evaluation.

NOTE: Regulation XVII of the St. Louis County Air Pollution Control Code has the following to say in regard to motor vehicles:

1. The emission of visible exhaust from a car, truck, or bus for more than 10 CONSECUTIVE SECONDS is against the law.
2. No motor vehicle may idle longer than 3 consecutive minutes while standing (except in traffic or while loading).

Carbon Monoxide Emissions by Motor Vehicles in the United States, 1960–90



Projections based on proposed 1973 and 1975 Federal Standards

(Millions of tons per year)

SOURCE	CARBON MONOXIDES	SULFUR COMPOUNDS	HYDRO-CARBONS	NITROUS OXIDES	PARTICLES	TOTAL
Transportation	66	1	12	6	1	86
Industry	2	9	4	2	6	23
Power Plants	1	12	1	3	3	20
Space Heating	2	3	1	1	1	8
Refuse Disposal	1	1	1	1	1	5
Totals	72	26	19	13	12	142

Source: National Air Pollution Control Administration, HEW.

TEACHER PREPARATION

1. Ask an automobile mechanic to visit the class to explain the automobile air pollution control devices now being used. Ask him to explain others which are being tested. Perhaps he can bring a sample device to show your class.

2. Speaker from the Air Pollution Control Department, St. Louis County. This department will send out a speaker who will show slides and present a discussion for the class on air pollution in the St. Louis Metropolitan area. Contact:

   Mr. Donald Pecsok
   Air Pollution Control
   801 South Brentwood Blvd.
   Clayton, Missouri 63105
   Telephone: PA6-1100, Extension 281

3. One copy of Student Worksheet #35 for each student in the class.

4. One copy of Student Worksheet #36 (7 pages) for all high ability students.

5. One copy of Student Worksheet #36 for each student in the class.

6. Films:

   "Air Pollution"
   Cooperating School Districts
   10 minutes; color

   "Autos and All That Traffic"
   St. Louis County Library (994-3300)
   30 minutes, color

STUDENT ACTIVITIES

1. Visit by auto mechanic
2. Speaker from Air Pollution Control
3. Student Worksheet #35, "Pollution Produced by the Automobile"
4. Student Worksheet #36, "Bonus Activities for Above Average Students."
5. Student Worksheet #37, "Choice of Individual Activities by the Student"
6. Films: "Air Pollution," "Auto And All That Traffic"

CONCEPT XI

The automobile has increased noise pollution.

BEHAVIORAL OBJECTIVE 11

One hundred percent of the class will be able to write in three separate sentences the ways in which the automobile increases noise pollution.

TEACHER BACKGROUND

In the United States, we are beginning to realize that man should not tolerate indefinitely the increasing noise that presently characterizes the modern, industrialized nation. Noise is a profound annoyance to most people. It has increased in volume in the last thirty years and continues to rise in urban areas at a rate estimated at one decibel per annum.

The automobile is the major cause of noise pollution. Manufacturers can develop quieter cars with less noisy engines. Roadways that muffle or reduce noise can be constructed. The noise from a roadway can be reduced by sinking it below the surrounding surface. Sloping walls at the sides of roadways will reduce noise. Dense plantings of shrubs, bushes, and trees at the sides of roadways will scatter and absorb sound.

Some simple techniques can be used to muffle sounds or noises in rooms or buildings:

1. Carpeting is a good sound-deadening material in most rooms.
2. Acoustical tile is good for the walls and ceiling.
3. Perforated hardboard with movable hooks is attractive and functional.
4. Bulletin boards of cork.
5. Draperies cut down the reflection of sound in a room.

The following wall materials are effective in stopping the passage of sound (in order of effectiveness):

1. Solid brick wall.
2. Plaster wall of porous metal lathe covered with 3/4 inch of plaster.

3. Plasterboard wall.
4. Two sheets of glass with 1/2 inch of air space between.
5. Single sheet of glass.
6. Sheet of 1/4 inch plywood.

The following are aspects of the problem of traffic noise in relation to planning and development of highways:

1. Steep grades on roadways tend to increase noise levels (trucks and buses must accelerate along inclines).
2. A community needs to continually review its commercial routes---routing of heavy vehicles through certain sections of the city should be kept down as much as possible.
3. Study the topography and use contours and existing features of the landscape as natural barriers to confine sound.
4. Elevated roadways are effective in reducing sound levels in that noise is carried up and away.
5. Mount sound barriers on a roadway (these can be functional and beautiful).
6. The most effective, perhaps, is to develop an adequate rapid transit system.

In accordance with the Noise Abatement and Control Act of 1970:

EPA (Environmental Protection Agency) has set up an office of Noise Abatement and Control to evaluate health hazards to the extent possible, summarize the state-of-the-art in noise suppression technology, and recommend a program of counter-measure to Congress.

Public hearings have been held in various parts of the country to determine the extent of the problem and identify required control measures.

TEACHER PREPARATION

1. One copy of Student Worksheet #38 for each student. Assist the students in finding additional examples of noise and then to classify these noises.

2. One copy of Student Worksheet #39 for each student. If it is possible to loan a tape recorder at your school, assist the students to record the travel noise.

STUDENT ACTIVITIES

1. Student Worksheet #38, "Our Noisy World."

2. Student Worksheet #39, "The Automobile and Noise Pollution."

CONCEPT XII

The aesthetics of the roadside have been affected by the use of the automobile.

BEHAVIORAL OBJECTIVE 12

By use of a sketch and one sentence, ninety percent of the class will be able to show how the automoible has damaged the aesthetics of the roadside.

TEACHER BACKGROUND

With the increased number of automobiles more and more highways had to be constructed. The need for roadways grew so rapidly in such a short span of years that for many cities their one aim was to get the highway built. Not much concern was shown for the aesthetics of the roadside. Miles of natural landscape were destroyed. Trees being uprooted in a thoughtless manner, caused soil erosion; unpleasant sites (Junkyards) once blocked by the trees now show as "open sores" on the highway. Instead of wide landscaped islands as medians we now have miles of cold steel bars which cause headlight glares from oncoming traffic.

Not only has thoughtless construction destroyed the aesthetics of the roadside, but so too have the occupants of the car. Billions of tons of litter line our roadsides and detract from their beauty.

The natural beauty of the landscape which has remained is many times blocked out by numerous billboards. Outdoor advertising signs became such a menace to beauty and safety that in 1965 the President sent to Congress proposals to eliminate outdoor advertising signs from highways.

The following points of the state law concerning highway billboards were obtained from the Missouri State Highway Department:

1. All commercial advertising signs should be approximately 660 feet from the highway. The Missouri State Highway Department has the right to make certain regulations pertaining to lighting, spacing, size of signs, and which signs are to be in which locations.

2. In areas zoned for commercial or industrial use no permits are needed from the Missouri State Highway Department for advertising signs. However, individual counties may demand a permit.

3. More lenient laws govern directional and recreational signs.

Note: If more detailed information is needed, request a leaflet on State Law and Highway Billboards from the Missouri State Highway Department.

Facts obtained from the County Highway Department:

1. Signs on corner lots of subdivisions or intersections of two county street must be thirty feet back from the street and not more than three feet tall.
2. A person must obtain permission to erect a billboard from the St. Louis County Department of Planning.

TEACHER PREPARATION

1. One copy of Student Worksheet #40 for each student. Allow the student to make his design as fancy as he wishes. Do not offer any criticism.

2. One copy of Student Worksheet #41 for each student. As the student begins to realistically examine his drawing or plan, make sure he sees problems such as expense, watering, daily care, vandalism, etc.

3. One copy of Student Worksheet #42 for each student in the class.

STUDENT ACTIVITIES

1. Student Worksheet #40, "Adding to the Aesthetics of the Highway"

2. Student Worksheet #41, "Idealism vs. Realism"

3. Student Worksheet #42, "Rating of Billboards"

CONCEPT XIII

Many times, the use of the automobile has resulted in the destruction of property.

BEHAVIORAL OBJECTIVE 13

Ninety percent of the students will be able to list at least three types of damage to property caused by the automobile.

TEACHER BACKGROUND

On practically every news broadcast and in every issue of the newspaper accounts of automobile accidents are related to us. 50.1 percent of these accidents involve a collision with a motor vehicle in transport. The second highest percent, 27.6% of total accidents, deals with collision with fixed objects. These automobile accidents bring destruction or damage to trees, shrubbery, lawns, homes, fences, and lawn decorations (fountains, statues, flower beds). Besides these types of personal property damage, there are also various kinds of damage to governmental and commercial property. This type of damage would include traffic signs, highway medians, mailboxes, light standards, telephone poles, etc.

Collision with animals has a 5.7 percent of total accidents while collision with parked cars is 2.6 percent.

TEACHER PREPARATION

1. One copy of Student Worksheet #42 for each student in the class.
2. One copy of Student Worksheet #44A for each student in the class.
3. One copy of Student Worksheet #44B for each student in the class.
4. Film:

   "Drive Defensively"
   St. Louis County Library (994-3300)
   11 minutes; color

STUDENT ACTIVITIES

1. Student Worksheet #43, "Interview with a Person Who Has Had Property Damage"
2. Student Worksheet #44A, "A Funny Thing Happened on the Way to Aunt Martha's"
3. Student Worksheet, #44B, "Report of Motor Vehicle Accident"
4. Film: "Drive Defensively"

CONCEPT XIV

Increased use of the automobile has created problems which in turn have necessitated a study of alternatives for this dilemma.

BEHAVIORAL OBJECTIVE 14

Eighty percent of the class will be able to list four problems that have been brought on by the automobile and also list one alternative for each of these four problems.

TEACHER BACKGROUND

At the present time 82 percent of commuting workers rely on the automobile, while only 14 percent utilize public transit. What needs to be done is to eventually force the urban motorist to public transportation. What follows are some proposals to bring about a better utilization of public transportation:

1. More effective measures to restrict traffic in congested areas, especially during rush hours. The city could employ photographic equipment to record license numbers of autos passing through specified areas during rush-hour traffic. These drivers would then be sent a bill at the end of the month for the privilege of contributing to the rush hour snarl.
2. Charging tolls on cars entering major cities, If a car has five or six passengers, there may be no charge; a small toll for cars with three or four passengers; a larger toll for cars with two occupants; and a larger toll for those with only a single occupant. Since the single driver contributes disproportionately to the congestion and pollution in the urban area, he would have to pay for this privilege.
3. Taxes on urban parking places. (San Franscisco has put a 25 percent tax on parking fees in private garages.)
4. Continued and increased federal aid to urban transportation systems to make them attractive and eventually economically viable. Highway tax receipts are currently swelling the Highway Trust Fund; instead, these should be diverted to the

general treasury. From this source, monies could be expended on all forms of public transit.

Other measures which could be introduced to control the automobile population include:

1. A Congressional resolution stating that the one-car family is the American ideal.
2. A higher tax rate for a second family car; still higher rates for a third car.

TEACHER PREPARATION

1. Prepare one copy of Student Worksheet #45 for each student in the class.

2. Prepare one copy of Student Worksheet #46 for each student in the class.

3. Films:

"Golden Age of the Automobile"
St. Louis County Library (944-3300)
30 minutes; color

"City----Cars or People"
Cooperating School Districts
28 minutes; black and white

"Autos and All That Traffic"
Cooperating School Districts & St. Louis County Library
30 minutes, color (994-3300)

STUDENT ACTIVITIES

1. Complete Student Worksheet #45, "Problems Created by the Automobile"

2. Complete Student Worksheet #45, "A Problem and Its Solution Illustrated by an Art Activity."

3. Films: choice of three

CONCEPT XV

Rapid transit is one solution to the problem of congested highways.

BEHAVIORAL OBJECTIVE 15

Eighty percent of the class will explain in a four-sentence essay how rapid transit is a solution to the automobile problem.

TEACHER BACKGROUND

Is the day coming when many Americans will be forbidden to drive their cars to and from work? That prospect has been raised recently by urban planners and environmentalists bent on curbing rush-hour traffic jams and the air pollution that the backups cause.

Many cities, however, have already taken steps to reduce commuter traffic, such as providing parking on the fringes of downtown. Other municipalities are considering similar measures.

Transportation agencies are experimenting with a wide range of programs designed to get commuters out of their cars. But observers warn that a major effort is needed to change the public's deeply ingrained commuting habits.

The head of the Urban Mass Transportation Administration estimates that 86 percent of the nation's commuters come to work in their own cars. Only 10 percent use busses, and 4 percent ride rail systems.

Commuters, in fact, have been turning away from, not toward, public or mass transit for the past 27 years. As a result of the change, transit has been caught in a whirlpool of declining services, revenue and passengers.

One federal transportation official said, "The only way you're going to get people out of those cars and into transit is to make transit more attractive as an alternative for commuters. You can do this by making it more difficult to operate an automobile downtown, but you must also improve the quality and speed of transit systems. We're working on both approaches."

Some public officials contend that the best way to attract more passengers to mass transit is to abolish or, at least, drastically reduce the fare, and replace the lost revenue with a government subsidy.

TEACHER PREPARATION

1. Read the general information given you in the Teacher Background. Be familiar enough with the trends in rapid transit so that you can begin this concept with a brief discussion that will define the term rapid transit.

2. One copy of Student Worksheet #47 for each student. Be prepared to assist them in using the Readers' Guide and if the school library appears to be short certain magazines, direct them to branches of the St. Louis County Library.

3. One copy of Student Worksheet #48 for each student.

4. Films:

   "Freedom of the American Road"
   County Library (994-3300)
   20 minutes, black and white

   "Automania"
   County Library
   10 minutes, color

   "Freeway Phobia"
   Cooperating School Districts
   30 minutes, color

STUDENT ACTIVITIES

1. Class discussion on rapid transit.

2. Student Worksheet #47, "The Ever-Changing World of Rapid Transit"

3. Student Worksheet #48, "Designs for the Future"

4. Films: choice of three.

CONCEPT XVI

Car pools offer an immediate solution to the problem of congested highways.

BEHAVIORAL OBJECTIVE 16

Given a situation, ninety percent of the students will be able to conclude that car pools offer a solution to the crowded highways.

TEACHER BACKGROUND

San Francisco is trying a new idea to encourage car pools. The Oakland Bay Bridge now reserves three lanes for use only by buses and car pools--which experts say both help take drivers off the roads.

The car pools pay no tolls, and buses are billed monthly. But a car occupied by only one person must stand in line to pay 50 cents.

Drivers are charged the tolls only when entering th[illegible]ity and not when leaving.

Two weeks after the program began, an official stood at the toll area and watched seven buses race through, while hundred of cars stood in line.

"Those seven buses carry as many passengers as 295 automobiles," he said. During the two weeks, the number of toll-free car pools doubled.

TEACHER PREPARATION

1. Read Carefully the background given above and make a short presentation to the students concerning the Oakland Bay Bridge idea.

2. One copy of Student Worksheet #49 for each student.

3. One copy of Student Worksheet #50 for each student.

STUDENT ACTIVITIES

1. Presentation by teacher of Oakland Bay Bridge idea.

2. Student Worksheet #49, "Using the Car Count to Gather Data"
3. Student Worksheet #50, "Surveying the Need for Car Pools"

CONCEPT XVII

New power sources are being tested to minimize pollution and natural resource depletion caused by the automobile.

BEHAVIORAL OBJECTIVE 17A

Eighty-five percent of the students should be able to list a new power source that is being tested to minimize pollution.

TEACHER BACKGROUND

The following information was obtained from Laclede Gas Co.:

For the past year Laclede Gas Co. has been working with C.N.G. (Compressed natural gas) as an alternate to fuel vehicles. It is termed as an "alternate" because the gasoline operation of the vehicle is not effected by the addition of the C.N.G. system. A simple flip of a toggle switch on some kits or a flip of a switch and the movement of a choke cable on others will allow the driver to change from one fuel to another.

Why should Laclede Gas Co. spend time and money on such a project? In a time when ecology and pollution rate as one of our major problems and the federal government has set up standards to be met on controlling carbon monoxide, hydrocarbons and oxides of nitrogen, the company felt that with a product like natural gas, which is ninety percent cleaner burning than gasoline, it was time to convert a portion of its vehicles to operate on natural gas.

A brief description of the C.N.G. system is as follows:

Natural gas is compressed at 2300 pounds and stored in safety inspected tanks located conveniently on the vehicles. From the tanks the gas is passed through tubing or hose to two stages of regualtion. The first stage regulator cuts the pressure from 2300 pounds to 55 pounds. The second stage regulator reduces the pressure from 55 pounds to anywhere from one to ten inches of water column pressure. This varies according to the type of kit used. From the second stage regulator the gas is passed to an airmixer which is the heart of the unit. The airmixer is mounted on top of a conventional carburetor and regulates the amount of gas needed for the load. All of this is accomplished through a series of switches and valves.

At the Shrewsbury location (4118 Shrewsbury Ave.) there are at present 26 vehicles on C.N.G. and facilities to automatically fuel 100 vehicles. It is necessary for the driver to connect a quick disconnect hose when parking in his assigned stall and his vehicle will be automatically fueled with C.N.G. Also available is a quick fill station where driver's cars can be more rapidly charged with C.N.G.

The disadvantages of operating on C.N.G. are:

1. The cost of the conversion kit, which is over $400 per vehicle.
2. There is a fifteen percent power loss.
3. The storage tanks add additional weight and take up needed space in some cases.
4. Limited compressor stations make conversion practical to fleets only.
5. Driving range limitation----three tanks are good for approximately 120 miles.

Some of the advantages are:

1. Clean air. It is estimated that vehicles in this country account for fifty to ninety percent of general air pollution.
2. Oil and oil filters would only have to be changed annually instead of quarterly.
3. The life of components, such as spark plugs, mufflers and the engine itself, would be greatly increased.
4. Price of gas compared to gasoline is much less.
5. Starting in cold weather should be easier because natural gas is easier to ignite. It does not require vaporizing like gasoline.

It is asked how safe is C.N.G. when it is stored at 2300 pounds? Natural gas is lighter than air, and if a leak should occur the gas will rise and dissipate into the atomosphere. Gasoline, being heavier than air, would drop to the ground where it could easily be ignited.

Natural gas is stored in pressurized containers approved by the Interstate Commerce Commission and the Department of Transportation. These fuel cylinders are mounted in such a manner as to better resist crash forces and are vented.

It takes a very hot spark to ignite natural gas----- 1,300 degrees fahrenheit. Also, the ratio of natural gas mixed with air must be **within** narrow limits in order for combustion to take place.

The system or kit is easily and inexpensively transferable from one vehicle to another. There is no reason why natural gas, which is clean burning and used by millions of Americans to cook with, could not as easily be used to power vehicles.

TEACHER PREPARATION
17A

1. Review the **material** found in "teacher background" with the students. This is one example of a new fuel being tested, and perhaps the students will come forth with other ideas to be researched.

2. Have a representative from Laclede gas come to school and show slides and give a talk on the company's conversion system. Small groups could visit the Shrewsbury plant for a demonstration. Contact:

   Laclede Gas Co. (Home Service Department)
   4118 Shrewsbury Ave. 63119
   Phone: 644-6650

3. One copy of Student Worksheet #51 for each student in the class.

STUDENT ACTIVITIES

1. For general class discussion:

   A. What types of pollutants do cars emit into our air?
   B. Would converting automobiles to a different type fuel (natural gas, electricity, etc.) give us a cleaner environment?

2. Either:

   A. Field trip to Laclede Gas Co. (Shrewsbury)
   B. Talk by representative of the company

3. As an extended project, students (individual or groups) may write to the motor companies in Detroit (Ford, General Motors, Chrysler) to find out if they have plans for or are experimenting with different power sources for their automobiles.

4. Complete Student Worksheet #51, "Field Trip to Laclede Gas Co."

CONCEPT XVII

New power sources are being tested to minimize pollution and natural resource depletion caused by the automobile.

BEHAVIORAL OBJECTIVE
17B

Ninety-five percent of the students will be able to list five of the eight natural resources that have been directly or indirectly depleated by the automobile.

TEACHER BACKGROUND

The natural resources which go into the production of an automobile come from many different areas of the world. A good reading for this concept is Henry B. Lent's The Automobile. The following is an excerpt taken from his book:

> It was a scoop of reddish ore from the mines of Minnesota for iron and steel....cobbles of limestone from Indiana to purify the molten iron for its cast engine block....chunks of magnesium and nickel from India, and manganese from Mexico to toughen its steel....an industrial diamond from South Africa for grinding its precision parts... a bucketful of milky latex drawn from a Malayan rubber tree for its tires, weather-proofing strips, windshield-wiper blades, and belting....a lump of coal from West Virginia for blast furnace coke... a slab of asbestos from Paraguay for its brake linings and clutch facings....a bar of gold from Alaska for plating its ornaments....a bale of Australian wool for its carpeting, and Dixie cotton for felt and thread....copper from Chile for its radiator and electrical system....zinc from Bolivia for its battery....a giant spruce tree from British Columbia for its man-made tire cord fibers and upholstery... a slab of tin from Laos for soldering its maze of electrical wires....a shovelful of Jamaican bauxite ore for its aluminum parts....a sack of soybeans from Iowa for its paint....and a chunk of cork from Spain or Portugal for its engine gaskets and body insulation.

While most of the money goes into steel, millions also must go for the metal alloys that are added to molten steel to increase its strength and resistance to heat and wear----such as vanadium, nickel, tungsten, zirconium, molybdenum, manganese, and columbium. Also for the windows and windshields, silica sand is used by the tons.

TEACHER PREPARATION
17B

1. Prepare one copy of Student Worksheet #52 for each student in the class ("Natural Resources Used in Automobiles"). Following this activity, it is suggested that the students bring their worksheets to class for a general discussion of their findings.

STUDENT ACTIVITIES
17B

1. Student Worksheet #52,"Natural Resources Used in Automobiles"

CONCEPT XVIII

To alleviate controversy between insurance companies, no-fault insurance has been introduced.

BEHAVIORAL OBJECTIVE 18

Ninety-five percent of the students will be able to list two arguments for and two arguments opposing no-fault insurance.

TEACHER BACKGROUND

There is a trend in the various states to require all automobile owners to carry insurance so as to protect those they may injure. Massachusetts was the first state to enact a compulsory insurance law. The aim of such laws will have to be supplemented by others, such as automobile inspection laws which, if properly administered, should reduce the number of automobile accidents. In addition, such laws would place restrictions on drivers who are not adequately trained. Also, the use of annual examinations wherever necessary would also help to eliminate dangerous drivers, which inturn would reduce accident frequency.

The Massachusetts plan is a milestone as far as insurance law is concerned. The impact will be felt by: 1. driving attitudes; 2. insruance buying practices; 3. underwriting practices; 4. state insurance administration; and 5. insurance premiums.

The advocates of such a plan as Massachusetts cite the following criticisms of the present negligence system:

1. inadequacy of compensation
2. inequities in the judicial system
3. waste of premium dollars

The no-fault plan was passed by the State of Massachusetts in August, 1970. It is, of course, quite early to determine if the plan passed by this state will catch on in the other states.

It would be inappropriate to include the entire plan of Massachusetts here since it is quite lengthy. However, a copy of The John Liner Letter (a publication of the

Insurance Advisory Service) is included. This publication will furnish the following:

1. Arguments for no-fault insurance
2. Arguments against no-fault insurance

Note: Several no-fault bills were introduced in the 1972 Missouri Legislature, but none got off the ground. The legislature set up a special committee to make recommendations to the 1973 session.

TEACHER PREPARATION

1. Introduce the "pros" and "cons" of no-fault insurance as adopted by the State of Massachusetts. Follow the introduction with a class discussion.

2. Invite an insurance representative to speak to the class. (You may either invite one of your own or contact Mr. Robert Healy at #423-1812) Since this representative is going to talk about no-fault insurance, he should receive notice in advance in order to be adequately prepared. Specifically, he should point out the changes in Missouri if a no-fault insurance plan for automobile drivers was passed. Special reference should be made to the changes that would take place in: 1. liability insurance; 2. collision insurance; 3. comprehensive insurance; and 4. medical payment.

3. Prepare one copy of Student Worksheet #53, "Letter to State Prepresentative"

4. Prepare one copy of Student Worksheet #54.

STUDENT ACTIVITIES

1. Teacher-led presentation/discussion of the "pros" and "cons" of no-fault insurance using the "Reader's Digest" reprint for student background (this is student worksheet #53).

2. Visit by insurance representative.

3. Complete Student Worksheet #54, "Letter to State Representative."

CONCEPT XIX

The automobile industry provides many job opportunities, especially in automoible production, sales, auto and highway maintenance, insurance, and licensing.

BEHAVIORAL OBJECTIVE 19

Given a list of occupations related to the automobile industry, eighty-five percent of the students will be able to classify said occupations into the three categories of: 1. professional; 2. skilled or semi-skilled; and 3. unskilled.

TEACHER BACKGROUND

The automobile industry offers a wide variety of careers, the three prinicpal ones being in manufacturing selling, and servicing of automobiles. Also, many job opportunities are found in the insurance field, the various licensing bureaus, and the maintenance of our highway system.

Each of the above major areas offers a tremendous variety of job opportunities, which, in turn, is dependent upon the skills and training of the individual, seeking employment. In order to classify these job opportunities, the following list is suggested:

1. Professional: a vocation or occupation requiring advanced training in some area such as liberal arts or science and usually involving mental rather than manual work, as teaching, engineering, writing, etc
2. Skilled: having or requiring an ability, as in a particular industrial occupation, (e.g. machine operation), gained by special experience or a regular program of training or apprenticeship: as a toolmaker.

   Semi-skilled: of or doing manual work that requires some but not extensive training.
3. Unskilled: having no special skill or training; requiring or using no special skill or training.

In the professional field, graduates from college may take positions as chemists, engineers, metallurgists, physicists, or laboratory technicians. Some spend a great deal of their time in research; others, on the other hand, work closely with artists, designers, and draftsmen in creating new automobiles. College graduates are also

THIS PAGE WAS MISSING FROM THE DOCUMENT THAT WAS SUBMITTED TO ERIC DOCUMENT REPRODUCTION SERVICE.

The above job classifications are connected with the manufacturing of the automobile. Also, many jobs are available in the selling of the car, and it is recommended that these salesmen have training or experience as an engineer or mechanic.

Servicing of the automobile offers many job opportunities. Many young men like to work in garages, gasoline service stations, or the service departments operated by automobile dealers. Many of these employees recieve training by factory service instructors employed by the car manufacturers.

Insurance companies employ many individuals who have had specialized training. The Missouri Highway Commission employs individuals with a varied amount of training and experience in such areas as draftsmen, computers, engineers, and maintenance personnel.

The following list is included for those individuals who would like to find out more about job opportunities in the auto industry:

1. Automobile Manufacturers Association, 320 New Center Bldg., Detroit, Mich. 48202.
2. Automotive Electric Association, 16223 Meyers St., Detroit, Mich. 48235.
3. Independent Garage Owners of America, 36½ North Lewis, Tulsa, Okla. 74110
4. Missouri State Highway Commission, Missouri Blvd. Jefferson City, Mo., 65101.

TEACHER PREPARATION

1. For a field trip to the Chevrolet Division, General Motors, the following information is pertinent:
   - A. Contact: Personnel 383-2250, station 282.
   - B. Address: 3919 Union Blvd.
   - C. Hours and days: Monday---Friday (10:00 or 1:00).
   - D. Size of group: up to three classes.
   - E. Guide: supplied.
   - F. Tour time: one hour.

2. One copy of Student Worksheet #54 for each student (The general outline for this worksheet was taken from the Field Trip Handbook for Teachers, University of Missouri, St. Louis, 1969. The present tour may not follow this worksheet form).

3. Arrange to have an automotive faculty member from South County Tech to visit with your students. Contact either the principal or guidance counselor (12721 W. Watson Road; phone: 966-6810).

4. One copy of Student Worksheet #56 for each student in the class.

5. Films:

"Automation---Next Revolution"
Cooperating School Districts
28 minutes; black and white

"Industries of the Future"
Cooperating School Districts
26 minutes; color

STUDENT ACTIVITIES

1. Field trip to Chevrolet Division, General Motors.

2. Complete Student Worksheet #54, "Chevrolet Field Trip."

3. Visit by automotive faculty member from South County Tech.

4. Complete Student Worksheet #56, "Field Trip to Automobile Manufacturing Plant."

5. Films:

"Automation--Next Revolution"
"Industries of the Future"

CONCEPT XX

The automobile has changed the life style of most Americans.

BEHAVIORAL OBJECTIVE

Ninety percent of the students should be able to list the drastic and subtle manner in which the social world of man has been changed by the automobile.

TEACHER BACKGROUND

The predominance of the automobile as the chief mode of transportation has occasioned the creation and construction of places and activities which one can pursue with the automobile. In the past twenty years there has arisen innumerable drive-in restaurants, drive-in banks, drive-in grocery stores, drive-in cleaners, drive-in barbecues, drive-in hamburger stands, drive-in theatres, drive-in photomats, drive-in automobile diagnostic centers, and even drive-in churches. This has brought about not only a change in the landscape which these facilities occupy but also a change in the manner in which people pursue their daily business and social activities. People "live" in their automobiles and rely on them to offer the functions and comforts previously found in the home or in some other permanent structure.

TEACHER PREPARATION

1. Prepare one copy of Student Worksheet #57 for each student in the class.
2. Films: "Autos, the Great Love Affair"
   Cooperating School Districts
   57 minutes, black and white

STUDENT ACTIVITIES

1. Complete Student Worksheet #57 "The Automobile and the Life Style of Americans."

2. A class discussion on the following topic: "Is the existence of such drive-in facilities a cause or a result of the social changes in America?"

3. Show film "Autos, the Great Love Affair."

GIVE PRE-POST TEST TO STUDENTS

THE TEST IS ON PAGES 8 - 13 OF THIS UNIT

THE ANSWERS TO THE TEST ARE ON PAGES 14 - 17 OF THIS UNIT

TEACHER BIBLIOGRAPHY

Books

1. *Air Pollution Primer*. New York: National Air Conservation Commission, 1969. (County Health Department)

2. Berger, Robert and Templin, Joseph. *Law and the Consumer*. New York: Houghton Mifflin and Company, 1969. (Parkway East Junior High School)

3. Botkin, B. A. *A Treasury of American Folklore*. New York: Crown Publishers, 1969. (Parkway West Junior High School)

4. Chandler, M. H. *Man the Inventor*. Chicago: Rand McNally, 1965. (Parkway West Junior High School)

5. *Collier's Encyclopedia*. Chicago: Crowell-Collier Education Corporation, 1968. (All Parkway Junior Highs)

6. *Compton's Illustrated Science Dictionary*. Chicago: Encyclopedia Brittanica Educational Corporation, 1971. (Parkway West Junior High School)

7. *Encyclopedia Americana*. New York: Americana Corporation, 1970. (All Parkway Junior High Schools)

8. *Encyclopedia Britannica*. Chicago: William Benton and Company, 1971. (All Parkway Junior High Schools)

9. Heimler, Charles and Neal, Charles. *Principles of Science*. Columbus: Merrill Books, Incorporated, 1966. (Parkway School District, Curriculum Library)

10. Lavaroni, Charles, and O'Connell, Patrick. *Air Pollution*. Menlo Park: Addison-Wesley, 1971. (Parkway School District, Office of Science Consultant, Mr. Verlin Abbott)

11. Lent, Henry. *The Automobile--U.S.A.* NewYork: Dutton and Company, 1969. (Parkway West Junior High School)

12. Linkford, Francis and Goe, William, *Consumer Mathematics*. New York: Harcourt, Brace and Company, 1971. (Parkway School District, Curriculum Library)

13. McGraw-Hill Encyclopedia of Science and Technology. New York: McGraw-Hill, 1971.(Parkway West Junior High School)

14. Merit's Student Encyclopedia. Chicago: Crowell-Collier Educational Corporation, 1971 (Parkway West Junior High School)

15. Missouri Constitution. St. Louis: State Publishing Company, 1967. (All Parkway Junior High Schools)

16. Navarra, John G. Our Noisy World. Garden City: Doubleday and Company, 1970. (Parkway West Junior High School)

17. New Frontiers in Science. Chicago: Children's Press 1964. (Parkway West Junior High School)

18. O'Donnell, Patrick and Lavaroni, Charles. Noise Pollution, Menlo Park: Addison-Wesley, 1971. (Parkway School District, Office of Science Consultant, Mr. Verlin Abbott)

19. Official Manual, State of Missouri. Jefferson City: 1969-70. (All Parkway Junior High Schools)

20. Owen, Wilfred and Bowen, Ezra. Wheels. New York: Time-Life Books, 1968. (Parkway West Junior High School)

21. Preston, Ralph and Tuttle, John. In These United States. Lexington: Heath and Company, 1969. (Parkway School District, Curriculum Library)

22. Science Year. Chicago: Field Enterprises, 1971. (Parkway West Junior High School)

23. Tracy, George; Tropp, Harry; and Friedl, Alfred. Modern Physical Science. New York: Holt, Rinehart, and Winston, 1970. (Parkway School District, Curriculum Library)

24. U.S. Department of Agriculture. Science for Better Living. Washington: U.S. Government Printing Office, 1968. (Parkway School District, Curriculum Library)

25. Weaver, Elbert. Environmental Pollution. New York: Holt, Rinehart, and Winston, 1971. (St. Louis County Health Department.)

26. *World Book Encyclopedia*. Chicago: Field Enterprises, 1970. (All Parkway Junior High Schools)

Pamphlets

1. Citizens Historical Committee. *Creve Coeur and Surrounding Area*. Creve Coeur: Hausman, 1968. (Creve Coeur-Chesterfield Historical Society)
2. Missouri Highway Patrol. *Missouri Driver's Guide*. Columbia: The American Press, 1972. (Any Missouri State License Bureau)
3. *St. Louis Street and Vicinity Map*. (Any Gasoline Station)
4. *Towards a New Environmental Ethic*. U. S. Environmental Protection Agency, 1971. (St. Louis County Health Department)
5. *Traffic Crashes*. Missouri State Highway Patrol, 1971. (Missouri State Highway Patrol)

Magazines

1. "Attacking the Mass Transit Mess," *Business Week*, (June 3, 1972), 90. (St. Louis County Library)
2. Bermann, Thomas, "Autos and People--Room for Both?" *America*,(April 15, 1972), 402.
3. Brodine, Virginia. "Episode 104," Environment, (January-February, 1971), 2. (Parkway School District, Office of Science Consultant, Mr. Verlin Abbott)
4. "Search for Ways and Means," *U.S. News and World Report*, (March 3, 1972), 76. (Parkway West Junior High School)

STUDENT BIBLIOGRAPHY

Books

(All books were found in the Parkway West Junior High School Resource Center, Mrs. Sue Overton, Librarian)

1. Bergere, Thea. Automobiles of Yesteryear. New York: Dodd, Mead and Company, 1962.

2. Botkin, B.A.. A Treasury of American Folklore. New York: Crown Publishers, 1969.

3. Bowen, Robert Sidney. Hot Rod Showdown. New York: Criterion Books, 1967.

4. Brennan, Joe. Hot Rod Thunder. Garden City: Doubleday and Company, 1962.

5. Butterworth, W. E. Redline 7100. New York: Grosset and Dunlop, 1968.

6. Carter, Bruce, Speed Six. New York: Harper and Row, 1956.

7. Clarke, John. Roar of Engines. Garden City: Doubleday and Company, 1967.

8. Coombs, Charles. Wheels, Wings, and Water. Cleveland: World Publishers, 1963.

9. Engel, Lyle. The Complete Book of Nascar Stock Car Racing. New York: Four Winds Press, 1968.

10. Felsen, Henry. Boy Gets Car. New York: Random House, 1960.

11. Glenn, Harold T. Youth at the Wheel. Los Angles: Bennett and Company, 1965.

12. Griffin, Garnet. The Teenager and Safe Driving. New York: Rosen Press, 1968.

13. Halacy, D. S. Fuel Cells, Cleveland: World Publishers, 1960.

14. Harkins, Phillip. The Day of the Drag Race. New York: Morrow and Company, 1960.

15. Harrison, C. W. Find a Career in Auto Mechanics. New York: Putnam and Sons, 1964.

16. Heine, Robert. Your Future in Traffic Management. New York: Rosen Press, 1967.

17. Hellman, Hal. Roadbuilding in Modern America. New York: Lippincott, 1968.

18. Hoag, Edwin. The Roads of Man, New York: Putnam and Sons, 1968.

19. Hough, Richard and Frostick, Michael. History of the World's Classic Cars. New Yokr: Harper and Row, 1963.

20. James, Leonard, Following the Frontier. New York: Putnam and Sons, 1968.

21. Liston, Robert. Your Career in Transportation. New York: Messner, 1966.

22. Official Manual, State of Missouri. 1968-69.

23. Nader, Ralph. Unsafe at Any Speed, New York: Grossman, 1965.

24. Sibel, Rovert and Sarnoff, Paul. The Automobile Makers. New York: Putnam and Sons, 1969.

Encyclopedias

Various encyclopedias, common to all schools, were used in the preparation of this unit.

Pamphlets

1. Citizens Historical Committee. Creve Coeur and Surrounding Area. Hausman, 1968. (Available from Creve Coeur-Chesterfield Historical Society.)

2. Missouri Highway Patrol. Missouri Driver's Guide. Columbia: American Press, 1972. (Available from local License Bureau.

INDEX TO STUDENT WORKSHEETS

heet umber	Sheet Name	Related Concept
1	Concepts	all
2	Vocabulary List	all
3	Word Scramble of Types of Transportation	I
4	Field Trip Worksheet for National Museum of Transportation	II
5	Facts and Dates of Automobiles	III
6	How People in Parkway Go to Work	III
7	Biography of American Magnate	III
8	Automobile Glossary	IV
9	Comparison of Automobile Costs	IV
10	Staying Within Your Budget While Buying a Car	IV
11	What Factors Should Be Considered When Purchasing a Car	IV
12	How Can a Car Be Purchased if the Buyer Doesn't Have the Cash Price	IV
13	Factors Entering into Cost of Insurance	V
14	How Much Will Automobile Insurance Cost You?	V
15	How Insurance Rates Vary According to Locale	V

16	How Much Does Automobile Liability Insurance Cost?	V
17	What is Collision Insurance?	V
18	Can a Car Be Insured Against Damage Not Caused by Collision?	V
19	The Case of the Deceitful Driver	V
20	Missouri Driver's Guide Questionnaire	VI
21	Missouri and the License Plate	VI
22	Background Information for Slides Pertaining to the 1971 MUTCD	VI
23	Designing Graphic Road Signs	VI
24	The Parts of an Automobile	VII
25	Safety Inspection Checklist	VII
26	Crossword Puzzle on Automobile Glossary	VII
27	What Are the Actual Costs of Operating an Automobile after It is Purchased	VII
28	How Do Repairs and Upkeep Affect the Cost of Operation	VII
29	In Depth Activities on Automobiles	VII
30	Metropolitian St. Louis Area Map	VIII
31	Work Scramble	VIII
32	Locating the Arteries that Link Parkway with St. Louis	VIII
33	Parkway Area	VIII
34	Should the State Highway Commission Take Private Land for Public Roads	IX
35	Pollution Produced by the Automobile	X
36	Bonus Activities for the Above Average Students	X

37	Choice of Individual Activities by the Students	X
38	Our Noisy World	XI
39	The Automobile and Noise Pollution	XI
40	Adding to the Aesthetics of the Highway	XII
41	Idealism Versus Realism	XII
42	Rating of Billboards	XII
43	Interview with a Person Who Has Had Property Damage	XIII
44A	A Funny Thing Happened on the Way to Aunt Martha's	XIII
44B	Report of Motor Vehicle Accident	XIII
45	Problems Created by the Automobile	XIV
46	A Problem and Its Solution as Illustrated by an Art Activity	XIV
47	The Ever-Changing World of Rapid Transit	XV
48	Designs for the Future	XV
49	Using the Car Count to Gather Data	XVI
50	Surveying the Need for Car Pools	XVI
51	Field Trip to Laclede Gas Company	XVII
52	Natural Resources Used in Automobiles	XVII
53	Is No-Fault Insurance the Answer	XVIII
54	Letter to State Representative	XVIII
55	Field Trip to Automobile Manufacturing Plant	XIX
56	A Career in the Automobile Industry	XIX
57	The Automobile and the Life Style of Americans	XX

STUDENT WORKSHEET #1

CONCEPTS

TRANSPORTATION

I. Transportation is a necessary link between people and their work.

II. The St. Louis Metropolitan area utilizes many types of transportation of which the most important are private automoibles, airplanes, trucks, and barges.

III. The primary mode of transportation in the Parkway area is the automobile.

IV. The cost of a new automobile is determined by the base price and individual options.

V. Insurance coverage is largely decided by the owners insurance needs and the cost is determined not only by coverage chosen, but the area where the driver lives and the safety record of the driver.

VI. Local and state governments require licenses both for the car and the driver.

VII. Automobiles require continual maintenance to insure safety, proper performance, and licensing.

VIII. In the Parkway area, there are several arteries which link residential areas with the St. Louis Metropolitan area.

IX. Many acres of valuable land have been condemned by various levels of government for use in the construction of highways.

X. Air pollution is increased by the exhaust fumes of automobiles.

XI. The automobile has increased noise pollution.

XII. The aesthetics of the roadside have been affected by the use of the automobile.

XIII. Many times the use of the automobile has resulted in the destruction of property.

XIV. Increased use of the automobile has created problems which in turn have necessitated a study of alternatives for this dilemma.

XV. Rapid transit is one solution to the problem of congested highways.

XVI. Car pools offer an immediate solution to the problem of congested highways.

XVII. New power sources are being tested to minimize pollution and natural resource depletion caused by automobiles.

XVIII. To alleviate controversy between insurance companies, no-fault insurance has been introduced.

XIX. The automobile industry provides many job opportunities especially in automobile production, sales, auto and highway maintenance, insurance, and licensing.

XX. The automobile has changed the life style of most Americans.

Student Worksheet #2A

VOCABULARY LIST

Concept	Word
I	Transportation
II	Metropolitan St. Louis Area
II	Parkway Area
III	Interstate
IV	Base Price
IV	Options
V	Liability
V	Comprehensive
V	Insurance Coverage
V	$50 Deductible
V	Insurance Risk
V	Premium
V	Principal Driver
V	Partial Driver

Student Worksheet #2B

VI	Sales Tax
VI	Personal Property Tax
VI	Automobile Title
VII	Automobile Maintenance
VII	Safety Inspection
VIII	Limited Access
VIII	Arteries
VIII	Secondary Street
VIII	Collector Street
IX	Eminent Domain
IX	Land Condemnation
X	Air Pollution
X	Exhaust Fumes
XI	Noise Pollution
XI	Decibel
XII	Aesthetics

Student Worksheet #2C

XIV	Toll
XV	Rapid Transit
XVI	Car Pool
XVII	Natural Resources
XVII	Depletion
XVII	Power Source
XVIII	No-Fault Insurance
XIX	Professional Worker
XIX	Skilled Worker
XIX	Semi-Skilled Worker
XIX	Unskilled Worker
XX	Life Style

Student Worksheet #2A - Teacher Only

VOCABULARY LIST

Concept	Word
I	Transportation- movement of an object, live or inanimate, from one place to another.
II	Metropolitan St. Louis Area - The City and County of St. Louis and the immediate surrounding area.
II	Parkway Area - the geographical boundaries in which the Parkway School District is located.
III	Interstate- pertaining to more than one state; as, travel from one state to another.
IV	Base Price - the basic price of a car excluding "extras"; usually thought of as a car "stripped down."
IV	Options - the "extras" which an automobile buyer may add to his automobile, such as air conditioning.
V	Liability - a type of insurance which pays for damage to someone else's property or for personal injury to pedestrians.
V	Comprehensive - a "total" package of insurace which covers fire, theft, wind damage, vandalism, etc.
V	Insurance Coverage - the amount of insurance held by a policyholder for liability, collision, comprehensive, and medical.
V	$50 Deductible - when an accident occurs, the policyholder must pay the first $50 of the damage to his car.
V	Insurance Risk - the probable accident rate for certain groups of people based upon insurance computations.
V	Premium - the amount of money you must pay to the insurance company for your policy.
V	Principal Driver - the one who drives a car most of the time; some companies compute he uses the car 80-90% of the time.
V	Partial Driver - one who drives a car only "part time"; secondary driver.

Student Worksheet #2B

VI	Sales Tax - a state tax imposed on goods purchased by the consumer.
VI	Personal Property Tax - a tax placed upon your car, furniture, and other personal possessions; tax is assessed by county and city.
VI	Automobile Title - a legal document showing proof of automobile ownership.
VII	Automobile Maintenance - that which is required to keep an automobile in good running order, as repairs and upkeep.
VII	Safety Inspection - yearly requirement of the state before license may be purchased for your automobile.
VIII	Limited Access - limited number of businesses and turn-offs from the highway; usually applicable to interstate highways.
VIII	Arteries - interstate and other major highways.
VIII	Secondary Street - important street in a town or city without limited access.
VIII	Collector Street - streets in subdivisions and other locals which join the secondary streets and arteries.
IX	Eminent Domain - the right of the government to take private property for public use if just compensation is given.
IX	Land Condemnation - court action to take away private property for public use.
X	Air Pollution - emissions from automobiles, smokestacks, etc. which pollute our atmosphere.
X	Exhaust Fumes - gases and chemicals from gasoline burned by the automobile.
XI	Noise Pollution - sounds whose intensity is great enough to cause discomfort to the human ear.
XI	Decibel - a unit for measuring the volume of sound.
XII	Aesthetics - the study or philosophy of beauty.

Student Worksheet #2C

XIV	Toll - a tax for the privilege of passing over a bridge or along a highway.
XV	Rapid Transit - transporting of large numbers of people by a single vehicle.
XVI	Car Pool - several individuals going to work in one car rather than each taking his own vehicle.
XVII	Natural Resources - actual and potential forms of wealth supplied by nature, such as coal,oil, etc.
XVII	Depletion - a state of exhaustion resulting from excessive loss or use.
XVII	Power Source - the material or resource used to run an object such as an automobile.
XVIII	No-Fault Insurance - automobile insurance first passed by Mass. which overrules the "fault" system in automobile accidents.
XIX	Professional Worker - requiring advanced training in areas as liberal arts or science, involving mental rather than manual work.
XIX	Skilled Worker - requiring special ability gained by special experience or a regular program of training.
XIX	Semi-Skilled Worker - manual work, requiring some but not extensive training.
XIX	Unskilled Worker - requiring no special skill or training.
XX	Life Style - manner of living, the way people live.

Student Worksheet #3

WORD SCRAMBLE OF TYPES OF TRANSPORTATION

1. **pbiml** ____________________
2. gnwoa ____________________
3. ttblfaao ____________________
4. rktcu ____________________
5. tkases ____________________
6. lacem ____________________
7. arc ____________________
8. hips ____________________
9. lcpoetrhie ____________________
10. rnita ____________________
11. itrocah ____________________
12. leieepcovd ____________________
13. rtteearsc ____________________
14. eainlarp ____________________
15. tgbtuao ____________________
16. coteros ____________________
17. gldeir ____________________
18. ocean ____________________
19. syreur ____________________
20. esroh ____________________
21. cacosatgeh ____________________
22. edilbrigi ____________________

Student Worksheet #3

23. e r b g a __________________________

24. s u b __________________________

25. e m l o c t y o c r __________________________

ANSWER SHEET FOR WORD SCRAMBLE

1. blimp
2. wagon
3. flatboar
4. truck
5. skates
6. camel
7. car
8. ship
9. helicopter
10. train
11. chariot
12. velocipede
13. streetcar
14. airplane
15. tugboat
16. scooter
17. glider
18. canoe
19. surrey
20. horse
21. stagecoach
22. dirigible
23. barge
24. bus
25. motorcycle

STUDENT WORKSHEET #4

FIELD TRIP WORKSHEET FOR NATIONAL MUSEUM OF TRANSPORT

Take notes on these questions as you travel through the Museum. A short study period will be given when we return to school so that you can reorganize your notes into usable answers.

1. List the various types of transportation seen at the Museum.

2. Electric, steam, gasoline, and manual power were used in various modes of transportation. Explain how each of these were utilized.

3. Observe the engineer's compartment of the engine, particularly Engine #4006. Comment on the following:

   Visibility
   Temperature
   Boiler
   Controls

4. The train served many purposes. List at least three major services performed by the train.

5. What natural resources were used in the manufacturing of the vehicles at the Museum?

6. As you examine the busses and streetcars on the tour, write one sentence concerning each of the following:

   Comfort
   Safety
   Capacity
   Heating and Ventilation

7. One point of special interest will be the tour through the Vanderbilt Cars built in 1905. Jot down some notes on these points:

   Who are the Vanderbilts?
   Types of cars and layout of each
   Cost of the cars
   Materials used in the building and furnishing of the cars
   Use of these cars by the Vanderbilt Family

Can you give any examples of this type of private transportation vehicles today?

8. Choose one vehicle exhibited in the "Old Car Building" which seems especially interesting to you. Make a careful study and **perhaps** a sketch of this vehicle. Compare your facts for this model with a 1972 model of the same vehicle.

STUDENT WORKSHEET #5

INTERESTING FACTS ABOUT AUTOMOBILES

The Word *automobile* was first used in France in the late 1800's. It comes from the Greek word *auto-*, meaning *self*, and the French word *mobile*, meaning *moving*.

A Nation on Wheels. Over 50 per cent of the world's passenger cars are in the United States. Americans drive about 771 billion miles a year.

Car Owners. About 16 million American families, or about a third of the nation's car owning families, own more than one car.

Vacation Travel. Each year, more than 110 million Americans drive about 225 billion miles on their vacation trips.

Fuel Consumption of motor vehicles in the United States totals about 81 billion gallons a year.

Car Registrations in California, New York, and Pennsylvania account for about a fourth of all cars registered in the United States.

Cash and Credit. About 45 per cent of the new and used cars sold in the United States are paid for with cash. The rest are bought on credit that totals over $34 billion a year.

Weight of a typical American-made car is 3,345 pounds. This total includes 2,098 pounds of steel, 468 pounds of iron, 173 pounds of rubber, 90 pounds of glass, 21 pounds of plastics, and 20 pounds of paint and other protective coating.

Car Radios make up about two-fifths of all the radios produced in the United States each year.

Insurance Premiums paid on car policies of all types in the United States total about $10½ billion a year.

The First President to Ride in a Car was William McKinley. The car was an electric ambulance. It carried the President to a hospital after he was shot by an assassin in Buffalo, N.Y., in 1901.

Horsepower. In 1940, the horsepower of American cars ranged from 15 to 185. During the late 1960's, it ranged from 90 to more than 500.

IMPORTANT DATES IN AUTOMOBILE HISTORY

1770 Nicolas Joseph Cugnot of France successfully operated a three-wheeled steam-powered vehicle.

c.1860 Jean Joseph Étienne Lenoir of France developed an internal-combustion engine fueled by illuminating gas.

1885 Gottlieb Daimler and Karl Benz of Germany introduced gasoline engines of the type used in today's cars.

c. 1890 William Morrison of Des Moines, Iowa, built a car powered by electricity.

1893-1894 Charles E. and J. Frank Duryea built the first successful American gasoline-powered car.

1896 Henry Ford, Charles Brady King, Ransom Eli Olds, and Alexander Winton introduced their gasoline cars.

1901 Olds built 425 gasoline autos, which began the mass production of cars in the United States.

1908 Ford introduced the Model T. W. C. Durant organized the General Motors Company. Henry M. Leland introduced interchangeable parts for cars.

1912 General Motors introduced the electric starter.

1922 Balloon tires were introduced.

1926 Safety glass was introduced.

1935 Oklahoma City began the first parking meter system.

1938 Directional signals were introduced.

1946 Power-operated windows were introduced.

1948 Tubeless tires were introduced.

1950 Seat belts and power steering were introduced.

1966 Congress passed auto and highway safety laws aimed at reducing traffic accidents.

1968 Exhaust system devices that reduce unhealthful exhaust fumes became standard equipment on U.S. cars.

From World Book Encyclopedia

STUDENT WORKSHEET #6

HOW PEOPLE IN PARKWAY GO TO WORK

No. of Respondent	No. of Working People in Family	How People Go to Work		
		Car	Bus	Other
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

STUDENT WORKSHEET #7

BIOGRAPHY OF AN AUTOMOBILE MAGNATE

1. Read a biography of an automobile magnate. Some suggested names are: Henry Ford, Walter Chrysler, Charles Duryea, William Durant, Louis Chevrolet & Ransom Olds.

2. After completing the biography, make a booklet of the person's life. Include original drawings, illustrations or pictures in your booklet.

Note: A great deal of your booklet should be concerned with----"What outstanding accomplishments were achieved by the person in the automobile industry?"

STUDENT WORKSHEET #8

Preface: Since the automobile is usually the second most expensive item purchased by the consumer (home being #1), the buyer should be acquainted with the product he is about to purchase. The following automobile glossary is provided as an aid.

AUTOMOBILE GLOSSARY

1. Accelerator---a pedal, actuated by the driver, for varying speed by changing the amount of fuel fed to the engine.
2. Automatic transmission---a device that automatically changes gear ratios between the engine and rear wheels without manual assist.
3. Bearing---a mechanical part in or on which another turns.
4. Brake drums---drums, mounted on the wheels, against which the brake shoes press to stop rotation.
5. Carbon---a by-product of combustion in the cylinders.
6. Condenser---an electrical device connected across the contact points in the distributor to prevent arcing.
7. Cylinder---the bore in the cylinder block in which a piston operates.
8. Ethyl gasoline---a gasoline to which tetraethyl lead has been added to inhibit explosive combustion.
9. Four-barrel carburetor---a carburetor having four venturis, or throats, for the admission of the fuel-air mixture.
10. Fuel-injection pump---a mechanism to build up pressure for injecting fuel into the engine cylinder.
11. Fuel pump---a mechanically or electrically powered device for supplying fuel into the engine cylinder.
12. Gearshift---a mechanism by which the transmission gears are engaged or disengaged.
13. Governor---a control over engine speed, usually by means of an extra throttle valve in the carburetor.
14. Horsepower---a unit measuring the ability of an engine to do work (1 hp = 550 foot-pounds per second).
15. Octane rating or number---a measure of the anti-knock qualities of a gasoline. Motor-vehicle gasolines have an antiknock number from 90 to over 100.

16. Odometer---registers the distance an automobile travels.
17. Torque---the force delivered by the engine to the drive wheels, producing the rotation.
18. Transmission---the gearbox between the clutch and drive line for varying road speed and torque (rotary force).
19. Tune-up---an adjustment, usually of ignition and carburetion, to restore an engine to satisfactory performance.
20. Wheel alignment---the proper adjustment of all interrelated parts that affect steering.

STUDENT WORKSHEET #9

COMPARISON OF AUTOMOBILE COSTS

The student will pick out three different makes of automobiles which are comparable in cost (Chevrolet, Ford, and Plymouth, for example). Then make a check list and write the various costs for each of the three different automobiles on: 1. base price; and 2. options.

> Note: Make certain that you are comparing the costs of each car on a similar item----that is, you should NOT list the price of a stereo in a Ford and compare this cost to a fm radio in a Chevrolet.

After you have finished your research, bring your results back to the total group and compare your findings.

STUDENT WORKSHEET #10

STAYING WITHIN YOUR BUDGET WHILE BUYING A CAR

After eleven long years of saving your money, you have saved $4000 to purchase a new car. You have your mind made up on a brand new Rodent Ruiner. Please select the options for your new 'Ruiner' from the list of optional equipment below. REMEMBER, you may not go over your savings of $4000.

The incomparable RODENT RUINER ("Don't be bugged by our competition")

Base cost:	$2382.47
Your limit:	$4000.00

OPTIONAL EQUIPMENT	NOMINAL PRICE
Power Steering	$ 91.00
Power Dics Brakes	47.38
AM Radio	39.72
AM-FM Radio	102.16
8-Track Tape	207.48
Power Windows	96.88
Air Conditioner	350.67
Automatic Transmission	297.33
4-speed Transmission (on floor)	348.76
400 cu. in. motor	319.09
Floor mats	7.11
Whitewalls	12.23
Dual Exhaust	76.57
Graphic designs on hood	47.34
Vinyl top	86.77
Tinted Glass	41.13
Rally Wheel Covers (each)	18.47
Bucket Seats	117.82.
Bumper guards	21.55
2 4-barrel carburetors	101.96

STUDENT WORKSHEET #11A

WHAT FACTORS SHOULD BE CONSIDERED WHEN PURCHASING A CAR?

Ed Hampton found two used cars that he liked. One was six years old and priced at $875. The other was a late-model car at $1795. The terms were the same for both cars, namely, a down payment of 15 percent of the purchase price and 24 months to pay off the balance.

Ed couldn't make up his mind which car to buy because several unanswered questions were bothering him. Was he getting the most for his money by buying either car? Were the two cars really as good as they looked? Could both cars be counted on to give reliable transportation at moderate cost? The most difficult question was whether he could really afford either car.

Purchasing a car is a big step for most people. It may be the largest single purchase, except for a home, that they will ever make. Here are some factors that anyone buying a new or used car should consider.

1. NEED--An automobile to be used in earning a living may be driven thousands of miles a year. It must be dependable. People who need a car only for driving to and from work, for shopping trips, and for recreation often buy a simple, low-cost car adequate for their needs.

2. COST--How much you pay for a car will be influenced by your income, the availability and cost of financing, how badly you need the car, costs of operation and maintenance, and your own desires. Financing makes it easier to purchase a car, but don't overlook the fact that the finance charge (interest) will INCREASE the total cost of an automobile.

STUDENT WORKSHEET #11B

EXERCISES:

The following are prices from the classified advertisements of a newspaper for the same make and model of four different cars.

CAR A	CAR B	CAR C	CAR D
$ 850	$2295	$3995	$1195
995	2299	3644	1395
895	2450	4195	1325
1049	2390	3795	1289

1. How much difference is there between the highest and the lowest price for each car?

2. The average price of a make or model can be a guide in what you can expect to pay. What is the average price of each car listed in the classified ads?

3. If you can save $20 a month, how long would it take you to have enough money to buy Car A at $850?

4. Car B at $2450 can be purchased for $300 down and $60 a month until the balance is paid off. Ignoring the financing costs, about how long would it take you to pay for the car?

5. Car C at $3644 can be purchased for $400 down and $100.92 a month for 36 months. How much more will you pay for the car this way than if you paid cash?

TEACHERS ONLY - Answer Sheet for Student Worksheet #11B

1.	Car A	$199
	Car B	155
	Car C	551
	Car D	200

2.	Car A	$ 947.25
	Car B	2,358.50
	Car C	3,907.25
	Car D	1,301.00

3. 42½ months

4. 35 5/6 months

5. $389.12

STUDENT WORKSHEET #12A

HOW CAN A CAR BE PURCHASED IF THE BUYER DOESN'T HAVE THE CASH PRICE?

Do you know that if you have a good credit rating, an automobile dealer may make a better offer for your old car when you trade for a new one and pay for it with monthly payments than if you are paying cash? Many new and used car dealers have installed purchase plans that earn them money in addition to the profit on the car itself. It is this added profit that may make up for any extra amount offered you for your trade in.

An installment payment plan will make a car cost more than when bought for cash. The reason is that someone, perhaps the dealer but more often some other lending agency has paid the manufacturer for the car you are buying and expects to earn money on his investment. The addition payment is called CARRYING CHARGE, INSTALLMENT CHARGE, or simple INTEREST.

When a car is purchased ON TIME, an agreement or contract, is signed by both the dealer and the buyer. Before you sign a purchase contract for a car or for any other kind of merchandise, be sure to do the following things:

1. Read the contract completely, making sure that all blanks are filled in properly. Never sign a contract that is not completely filled in.
2. Check to see that the description of the car is complete and correct and includes year, make, model, body style, color, accessories, and identification numbers.
3. Make sure the contract specifies exactly the total carrying charge and the annual rate of interest.
4. Note carefully any special provisions such as what will happen if you make a payment late and if you can pay off the loan sooner than specified without an unreasonable penalty.
5. Check carefully to see that all parts of the transaction are covered by the contract--items such as price, all sales taxes, license fees, charges for special equipment, filing fees, insurance, down payment, and total carrying charge.

You are entitled to a completed copy of the contract signed by both you and the dealer. Insist on getting one! It is legal protection for you while you are paying for the car.

It may be cheaper to borrow money from a bank or loan company and pay an automobile dealer cash. In some states, however, you may not legally borrow money from any loan company or bank if you are under twenty-one years of age.

STUDENT WORKSHEET #12B

EXERCISES:

Ed Hampton found that he could purchase the two cars in which he was interested in the following ways:

	Six-year-old car	Late-model Used Car
Price	$895.00	$1795.00
Down payment, cash	150.00	300.00
Amount to be financed	745.00	1495.00
Total carrying charge	78.45	161.55
BALANCE DUE	823.45	1656.55

1. How much (nearest cent) would each of the twelve monthly payments be for the six-year-old car?

2. How much (nearest cent) would each of twenty-four monthly payments be for the late-model used car?

3. Ed reasoned that he should buy the late-model used car since he would have to pay only 40¢ a month more for it. Do you agree with Ed? Why or why not?

4. If Mr. MacDougall agrees to pay $400 down and $119 a month for 35 months for a new car, how much more than the list price of $3750 will he be paying?

Find the total amount paid for each of the following cars listed below:

		Cash Price	Down Payment	Monthly Payments	Number of months
5.	CAR A	$1240	$ 95	$54.00	24
6.	CAR B	2388	205	68.42	36
7.	CAR C	1795	100	63.60	30

8. Car A in exercise 5 costs $1391 with financing. How much more is this than the cash price?

9. If the interest rate is 6% per year on the sales price of an automobile, how much interest will be paid on a car priced at $2000 if it takes three years to pay off the contract?

Interest=principal x rate x time
Interest= $2000 x 0.06 x 3 = ?

TEACHERS ONLY - Answer Sheet for Student Worksheet #12B

1. $68.62
2. $69.03
3. Answers will vary
4. $8.15
5. $1,391.00
6. $2,465.17
7. $1,909.00
8. $151.00
9. $360.00

STUDENT WORKSHEET #13

FACTORS ENTERING INTO COST OF INSURANCE

COVERAGE	COMPACT CAR				FULL-SIZE CAR			
	17 yr. old single man, no tickets, with driver training, principal operator St. Louis County		35 yr. old married man, no tickets, principal operator St. Louis County		17 yr. old single man, no tickets, with driver training, principal operator St. Louis County		35 yr. old married man, no tickets, principal operator St. Louis County	
	0 accidents	2	0 accidents	2	0 accidents	2	0 accidents	2
Liability 10/20,000	$185	$237	$ 66	$117	$185	$237	$ 66	$117
Property Damage $5,000	$127	$162	$ 45	$ 80	$127	$162	$ 45	$ 80
Medical Payment $1,000	$ 23	$ 29	$ 8	$ 14	$ 23	$ 29	$ 8	$ 14
Comprehensive	$114	$145	$ 40	$ 72	$192	$245	$68	$121
Collision $100 Deductible	$237	$303	$ 84	$150	$335	$427	$118	$211
Uninsured Motorist	$ 6	$ 6	$ 6	$ 6	$ 6	$ 6	$ 6	$ 6
Towing	$ 2	$ 2	$ 2	$ 2	$ 2	$ 2	$ 2	$ 2
TOTAL	$694	$884	$251	$441	$870	$1180	$313	$551

STUDENT WORKSHEET #14

HOW MUCH WILL AUTOMOBILE INSURANCE COST YOU?

Individual Activity:

Each student in the class will investigate how the family insurance costs will change once he or she becomes a licensed driver. Your family insurance agent should help you in your research.

Be absolutely sure that you consider such factors as:

1. Age
2. Sex
3. Marital status
4. Automobile use (Will you be the principal driver?)
5. Type of auto
6. Autos covered by single policy
7. Driver's record
8. Driver training
9. Student's grades
10. Locale
11. Number of years the driver is licensed

Also, list your insurance agent's name, address, and phone number.

STUDENT WORKSHEET #15

HOW INSURANCE RATES VARY ACCORDING TO LOCALE

As an activity the class will be divided into four different groups.
Each group will investigate either:

a. liability insurance coverage
b. collision insurance coverage
c. comprehensive insurance coverage
d. medical insurance coverage

Each group will be expected to show how costs vary according to locale. For example:

> Assume that group "A" is supposed to investigate liability coverage. Then, its assignment could be to show how costs vary in at least four different areas:
>
> a. St. Louis CITY
> b. St. Louis COUNTY
> c. St. Charles County
> d. Jefferson County

After each group has done its research, the costs should be written out and brought back to the total group for evaluation and discussion.

STUDENT WORKSHEET #16A

HOW MUCH DOES AUTOMOBILE LIABILITY INSURANCE COST?

When Joseph Heatherton bought his car, he asked the dealer for rates for basic insurance coverage for an eighteen-year-old boy who would be the prinicpal driver of the car. Much to his amazement he found that he would have to pay nearly FOUR TIMES AS MUCH as his father, age forty-five, for the same amount of insurance.

Joe's insurance agent explained why. Only 17 percent of all drivers are between the ages of sixteen and twenty-five, but these UNDER AGE drivers are involved in 30 percent of all accidents. On the average, each of these accidents costs three-and-a-half times as much as an accident involving a driver twenty-five years of age or older. Insurance company records also show that for every $1 collected from drivers sixteen to twenty-five years old, $4 is paid out in claims. This, of course, partially explains why everyone's insurance is so high.

The state in which Bob lives requires all drivers to carry BODILY-INJURY LIABILITY and PROPERTY DAMAGE insurance. The first type of insurance protects a car owner against claims he would have to pay if his car caused bodily injury or death to others; the second type protects against claims the driver would have to pay if his car caused damage to another person's property. Both of these types are often referred to simple as LIABILITY INSURANCE. These two types of insurance are usually bought together in multiples of $10,000. For instance, Joe can buy liability insurance that will pay a maximum of $50,000 for claims made by one injured person, a maximum of $100,000 for claims made by two or more injured persons, and a maximum of $20,000 for damages to property. An insurance policy with these limits carries the designation 50/100/20. You can buy 10/20/5 or 30/50/10 or other combinations of liability insurace, but the difference in premium between low and high limits is so small that most people select the higher limits.

Many factors influence the cost of insurance besides the age of the insured. Rates are different in various districts within a large city, in urban areas, and in different regions of the United States. Generally the PREMIUM, the cost of the insurance policy, is based upon the number and ages of the drivers, the zone in which they live, and whether or not the car is used to get to and from work. In many cases the premium will be lower for a girl under twenty-five years of age than for a boy the same age. In some states there is no increase in premium for insurance on a family car when a teenage daughter becomes a licensed driver. A person who has had an approved driver training course will find his insurance premiums about 10 percent lower than those for a person who has not had such a course.

A driver who has possession of a car less than 50 percent of the time is classed as a partial driver. The principal driver has possession more than 50 percent of the time.

STUDENT WORKSHEET #16B

Suppose the father in a family is the principal driver, and the mother and an eighteen-year-old son are partial drivers. Both parents are forty-four years old. To find the premium for 50/100/10 liability insurance, use a rate table such as the one shown below, locate the premium for each member of the family. The highest of these amounts will be charged by the insuring company.

ANNUAL RATES--LIABILITY INSURANCE

Age of Driver	Amount of Insurance	PRINCIPAL DRIVER Male	PRINCIPAL DRIVER Female	PARTIAL DRIVER Male	PARTIAL DRIVER Female
18	50/100/10	$158.00	$61.60	$100.00	$54.60
44	50/100/10	$ 40,40	$40.40	$ 40,40	$40.40

These sample rates are for a five-year-old station wagon. Rates are, of course, subject to change and apply only to a particular car garaged in a particular location.

EXERCISES:

1. According to the rates in the table above, how much more does it cost an eighteen-year-old boy for liability than his forty-four-year-old father? How much more for an eighteen-year-old girl than her forty-four-year-old father? Assume that the father is the principal driver and the son and daughter are partial drivers.

2. If a 10% discount is allowed for a completed driver education program, how much lower will the liability insurance premium be for the boy and the girl in Exercise 1? What would be the total savings for each of them in the seven years before they are twenty-six years old?

3. The cost of liability insurance for an eighteen-year-old boy is about how many times as much as the cost of the same insurance for an eighteen-year-old girl? Assume that the boy and the girl are both partial drivers.

TEACHERS ONLY-Answer Sheet for Student Worksheet #16B

1. $59.60
   $14.20 (Note: son and daughter are partial drivers)

2. $10.00
   5.46
   70.00
   38.22

3. 2 times

STUDENT WORKSHEET #17A

WHAT IS COLLISION INSURANCE?

If you are involved in an accident that the investigating police officer says is your fault, you will have to pay to have your own car repaired. COLLISION INSURANCE provides protection against such expenses. Normally, car owners purchase either $50 DEDUCTIBLE or $100 DEDUCTIBLE collision insurance. This means that the car owner pays the first $50 or $100 of the repair bill, and the insurance company pays the remainder. The premium for $50 deductible collision insurance is higher than the premium for $100 deductible. Why do you think this is true?

EXERCISES:

For each accident described below, compute the amount paid by the insurance company:

		Amount of Accident Damage	$50 Deductible	$100 Deductible
1.	ACCIDENT A	$38.72	______	______
2.	ACCIDENT B	$70.25	______	______
3.	ACCIDENT C	$225	______	______
4.	ACCIDENT D	$1230	______	______

Sample yearly rates for collision insurance are given in the table below:

SAMPLE ANNUAL RATES
for COLLISION INSURANCE

Age of Driver	Type of Insurance	PRINCIPAL DRIVER		PARTIAL DRIVER	
		Male	Female	Male	Female
18	$50 Ded.	$68.00	$32.80	$40.60	$29.00
44	$50 Ded.	22.20	22.20	22.20	22.20

5. About how many times as much does it cost to insure an eighteen-year-old male principal driver for $50 deductible collision insurance as for a forty-four-year-old male principal driver?

STUDENT WORKSHEET #17B

6. What is the cost of $50 deductible collision insurance for an eighteen-year-old boy who is the principal driver of a car? About what percent of this amount would the boy save if he is classed as a partial driver rather than a principal driver?

Mrs. Smile was involved in an accident. The estimate of damages to her car was $1256 and to the other car $1058. The accident was Mrs. Smile's fault. Use the rate for a forty-four-year-old prinicpal driver ($50 deductible) and answer the following.

7. Which type of insurance paid for repairing the other car? for repairing Mrs. Smile's car?

8. How much did the accident cost the insurance company?

TEACHERS ONLY - Answer Sheet for Student Worksheet #17 A & B

1. 0, 0
2. $20.25, 00
3. $175---$125
4. $1,180---$1,130
5. 3
6. 40%
7. Liability------------collision
8. $2,318

STUDENT WORKSHEET #18

CAN A CAR BE INSURED AGAINST DAMAGE NOT CAUSED BY COLLISIONS?

Comprehensive material damage insurance protects a car owner against damage to his car caused by such things as fire, theft, flood, windstorm, hailstorm, riot, larceny, earthquake, and flying objects. The form of insurance will, for example, pay for stolen hubcaps, or for a broken windshield or a new convertible top if the damage was caused by any of the means listed abcve. It will also pay a claim made for articles stolen from a car, things such as clothes, cameras, and luggage. There must, however, be evidence of "forcible entry," this is, your car must have been locked at the time of the theft.

Sample rates for comprehensive material damage insurance are given in the following table for ages eighteen and forty-four.

ANNUAL RATES--"Comprehensive" Insurance

Age of Driver	Type of Insurance	PRINCIPAL DRIVER		PARTIAL DRIVER	
		Male	Female	Male	Female
18	Comprehensive	$33.60	$17.80	$22.60	$17.80
44	Comprehensive	15.80	15.80	15.80	15.80

EXERCISES:

The items listed were stolen from Barry Tompkins' locked car. The cost of repairing damage to the car was $22.

ITEM	VALUE
Camera	$65.00
Raincoat	25.00
Auto Robe	16.50

1. If Barry, age eighteen, had complete comprehensive insurance coverage, how much was his insurance claim?

2. If Barry paid $33.60 a year for comprehensive insurance, how much more did he collect on this one claim than he paid annually for the insurance.

3. The amount of the claim equals about how many years' premiums for the insurance?

TEACHERS ONLY - Answer Sheet for Student Worksheet #18

1. $128.50

2. $94.90

3. 4 years

STUDENT WORKSHEET #19

THE CASE OF THE DECEITFUL DRIVER

Melvin Mole bought a car and needed car insurance, but he had recently been involved in two serious accidents with his former car. He realized that if the insurance company knew his accident record, he could not buy insurance.

He went to the KINDA DEPENDABLE INSURANCE COMPANY and asked for car insurance. The agent asked him to fill out an application. One of the questions was: "Have you been involved in any auto accidents in the last five years?" Mel wrote "NO" in the space provided. The agent read Mel's application, signed it, took $50 from Mel and said, "You are now insured."

Two weeks later Mel smashed up his car. He filed a claim with the insurance company for $750, the value of the car.

QUESTIONS:

1. Should the insurance company be required to pay Mel? Why?
2. Did Mel commit fraud on the company? Explain.
3. What would have happened to Mel's application if the agent or the insurance company had known about his other two accidents?

STUDENT WORKSHEET #20

Using the Missouri Driver's Guide answer the following questions:

1. List those types of violations that can result in the maximum assessment of points for serious infractions.

2. Under what situation will one have his license suspended? Give maximum time of suspension.

3. Make a list of those required items that must be shown in a conspicuous place on all commercial vehicles.

4. What must one do after an accident that results in injury, death or extensive property damage? Give the penalty for any failure to comply with this law.

5. What safety action must all bus and cab drivers meet on approaching a railroad crossing?

6. How long, wide and high can a single unit truck in Missouri be? Are there any exceptions?

7. List those emergency items that every bus, truck, truck-tractor registered with the Missouri Public Service Commission must carry.

8. Give the license requirements for the operator of a motorcycle.

9. What is a student's permit? When is the permit valid?

10. List the major types of driving licenses.

11. How long may a tow line be when it is being used to tow one vehicle by another. What other safety condition must be met?

12. Give the day and night speed limits for the following:
    1. Divided federal highways
    2. Undivided federal highways
    3. City, town or village roads
    4. Other highways (state, townships)

13. If two cars enter an intersection at about the same time, which one should have the right of way?

14. Give the meaning for each of the following traffic signals:
    1. Flashing red light
    2. Flashing yellow light
    3. Circular yellow light
    4. Walk light
    5. Red

15. Make a drawing to show samples for each of the following traffic signs:

Interstate Highway U.S. Numbered Highway State (Missouri) Numbered Highway (one nearest your residence)

16. Make a drawing and give explanation for each of the hand signals that are given to alert other drivers and pedestrians in slowing down, turning, or changing lanes.

DEFINE THE FOLLOWING: Local Revoke Violation Chauffeur
Non-resident Operator Suspend Motorcycle Owner

STUDENT WORKSHEET #21

MISSOURI AND THE LICENSE PLATE

All vehicles in the State of Missouri must bear a license plate which is issued for one year. To obtain a license plate you must have the following: 1. car title; 2. personal property tax receipt; and 3. proof that sales tax on the car has been paid.

---

1. Name three locations where car licenses may be obtained.
2. If your parents own more than one car, did one license plate cost more than the other? Why?
3. Design a license plate for the State of Missouri. Keep the same size; use no more than two colors; and make a numbering system that would handle up to 6,000,000 cars, but do not put more than six digits or numbers on a license plate.

STUDENT WORKSHEET #22

BACKGROUND INFORMATION FOR SLIDES PERTAINING TO THE 1971 MUTCD

INTRODUCTION

Each of you in the audience today will soon be part of 111,000,000 drivers of vehicles in the United States. Americans are, undoubtedly, driving more miles and more frequently than we ever have before. When we do this, we require more information than ever before to make sure that we arrive at our destination safely and on time. The information we need is given to us with traffic control devices that advise us, warn us, and guide us along our way.

Now, I was talking about 111,000,000 drivers in the United States. When you add to that the many visiting foreign drivers who have problems understanding our language, you might be able to better visualize the highway engineers' task in providing traffic control devices that are truly informative and understandable. It is a complex job.

The development of traffic signs just didn't happen. It has been an evolutionary process. During this evolutionary process, two different philosophies on how to best convey messages have been developing. One is the European philosophy which relies heavily on symbols rather than words, and which has become a necessity because of the multilingual situation with which they are being confronted. The other is the U.S. philosophy, which relies more heavily on word messages.

Because of the increasing mobility on the part of the people of the world today, and most particularly here in the United States, the need for a uniform signing system has become imperative. This need was first recognized in the United States as far back as 1927, when the first manual on signing was developed. Since that time there have been several uniform manuals developed to aid in this uniformity here in the United States. The first one given universal sanction was the 1961 edition of the "Manual on Uniform Traffic Control Devices", this edition gained national acceptance and was implemented by all the states' highway departments and by most county and municipal governments. However, ten years later, the most comprehensive manual on traffic control devices ever published has become the new authority-the 1971 "Manual on Uniform Traffic Control Devices".

This manual was developed by a national committee composed of five major organizations involved in the use of traffic control devices on our highway and street systems. The organizations who participated in the development of this manual are:

The American Association of State Highway Officials
The Institute of Traffic Engineers
The National Committee on Uniform Traffic Laws
The National League of Cities
The National Association of Counties

Following the completion of the work by this committee and their parent organizations, a manual was developed which was approved by the federal highway administrator as a manual standard for our country.

Before going into the specifics of the various aspects of this manual, let me discuss certain conceptual points which are rather important in the utilization of this manual. One of the major items in this manual is that there are three conditions set forth for each of the traffic control devices shown in the manual. These conditions consist of a usage definition. As each of the devices is described in the manual, one of three terms are used to describe the parameters for its implementation. These three words are "shall" "should", and "may". The word "shall" indicates a mandatory condition. "Should" indicates an advisory condition. "May" indicates a permissive condition. With these three definitions as a guideline, there are a number of signs depicted in the manual which permit an option to be made by all governmental agencies. An example of these options would be in the situation of a "no left turn" sign. An option is permitted whereby either the symbolic sign or the word legend sign would be permissible. Each agency has the option of selecting one of these two types of signs. In other sign descriptions, only one sign is permitted. In this case, the word "shall" is used. In the slides we will be showing, we will indicate to you those signs which are mandatory and those signs which are optional. Our department has made its final decisions as to which of the optional signs will be used on the state highway system. It is important to know, however, that even though our department may not utilize specific options on the state highway system, the condition could be different in cities and county highways, so that while we use one sign, they may use the other.

The 1971 manual can be best characterized by the statement that this manual is one which places increasing emphasis on the use of symbols so as to provide improved direction and warning to the motorist. These symbols are made available since they have certain advantages when the motorist can make ready identification of this symbology. The chief advantage which derives from the use of symbology is improved legibility and visibility. Symbols also provide more flexibility in application.

Some of the symbols which will be utilized in the United States have been adopted directly from other systems, such as the Canadian and European systems. A basic concept of the regulatory symbology is the use of a red diagonal slash through a prohibited element with red circle background indicates a "NO" condition. Realizing that time must be given to the motorists to learn what these symbols mean, an educational worded sign will be mounted directly beneath the new symbol signs. The purpose is to acquaint the motorist by means of this educational plate so that some time in the future these plates can be removed and the symbol will stand by itself. While questions have been raised regarding the eventual success of such a program, there is little doubt in the minds of the engineers concerned with traffic control devices that this method will work. A good precedent is available. Many of you have probably observed in the past that when traffic signals were first utilized, the word "STOP" was imprinted on the red lens while the word "GO" was imprinted on the green lens. This educational designation was used for a number of years. This is the basic origin for the term "STOP and GO light". This practice, as you are aware, has been discontinued for the last 15 years and there is no doubt that virtually all motorists in the United States realize the significance of the traffic signal colors.

The Missouri Highway Department has a program which provides that striping changes on our state highway system will be completed by December, 1976. The optional changes which the department elects to accept would be implemented on a routine replacement basis over a long period of time.

STUDENT WORKSHEET #23

DESIGNING GRAPHIC ROAD SIGNS

Did you ever stop and ponder what it would be like to drive an automobile without being able to read the road signs? It would be most dangerous!

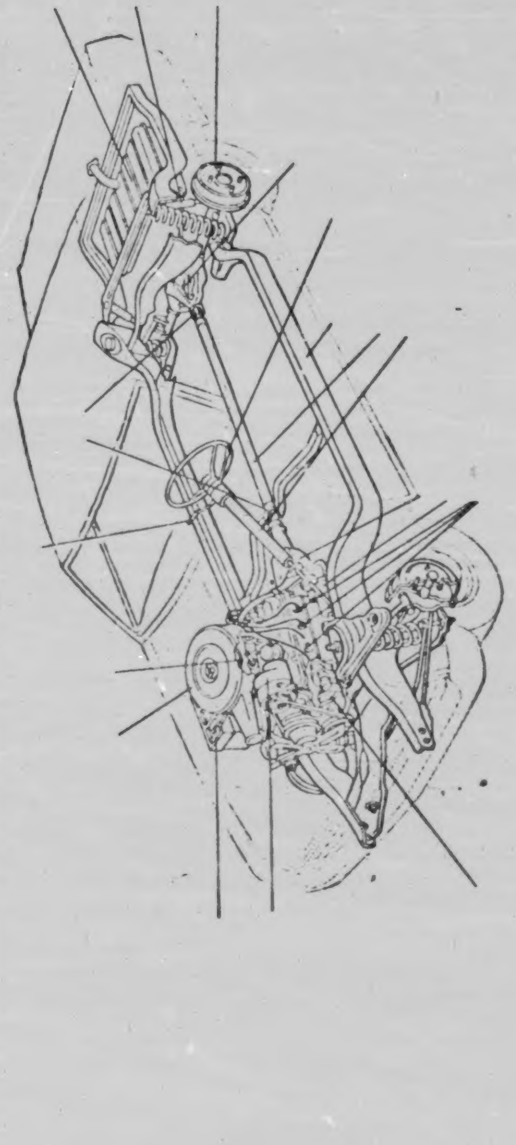
One solution to the problem would be to set up signs without words----only pictures.

Your task is to design standard graphic signs for six of the following:

- STOP
- YIELD
- DO NOT ENTER
- WRONG WAY
- CURVE
- MEN WORKING
- DIVIDED HIGHWAY ENDS
- TWO WAY TRAFFIC
- SCHOOL SIGN
- NO LEFT TURN
- RAILROAD CROSSING
- SPEED LIMIT 50

STUDENT WORKSHEET #24

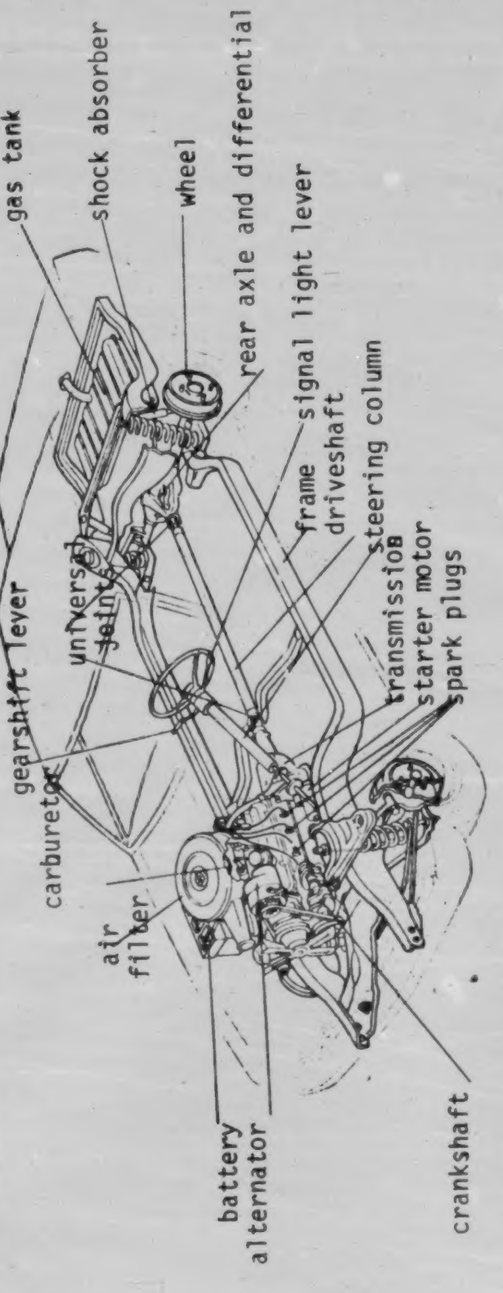
THE PARTS OF AN AUTOMOBILE



THE MODERN AUTOMOBILE consists of many different parts, all of which work together to produce a quiet, efficient, and reliable vehicl

BEST COPY AVAILABLE

TEACHER'S ONLY - Answer Sheet for Student Worksheet #24



THE MODERN AUTOMOBILE consists of many different parts, all of which work together to produce a quiet, efficient, and reliable vehicle.

STUDENT WORKSHEET #25

SAFETY INSPECTION CHECKLIST

Owner's Name Sample Copy

Street Address

City

Car ☐ Pickup/Panel ☐ Straight Truck ☐ School Bus ☐

Truck-Tractor ☐ Trailer ☐ Other Bus ☐ Motorcycle ☐

Mileage

(Year) (Make)

V.I.N. ____________________

REJECTION

The items checked in the rejected column do not comply with the inspection standards. Repairs may be made by yourself or at any place of your choice. No additional inspection fee will be charged for a reinspection if the vehicle is repaired and returned to this station within ten days.

I/M Signature & No.

Date ____________________

The following is an estimated cost to repair rejected items.

Rejected Items	Parts	Labor	Total Cost

As the vehicle owner, I understand that I am not required to have needed repairs made by the official inspection station, however, I authorize the station to repair the unsafe items of equipment which were discovered during the inspection.

Owner's Signature ____________________

APPROVAL: I certify that I have properly inspected each item of equipment required to be inspected.

Sticker and/or decal No. ____________________ has

been issued this date ____________________ and the white copy of MVI-2 given to the owner as a certificate of approval.

I/M Signature & No. ____________________

Station Name

Station Address

Station No.

A- 3352001

SAFETY INSPECTION CHECK LIST

(For specific details consult manual)

LIGHTING EQUIPMENT, SIGNALING DEVICES A R

High beam and indicator ___ Low beam ___ ___ 10 ___

Tail Lights ___ Reflectors ___ Stop Lights ___ ___ 11 ___

Lenses ___ Turn signals ___ Signal indicators ___ ___ 12 ___

HORN

Proper function and connections ___ 20 ___

STEERING MECHANISMS

Front wheel alignment ___ rear wheel tracking ___ ___ 30 ___

Steering wheel play ___ binding ___ ___ 31 ___

Proper wheel bearing adjustment: LF ___ RF ___ ___ 32 ___

Tie rod end, stabilizer link, pitman and idler arm ___ 33 ___

Ball Joints: RF ___ LF ___ Upper ___ Lower ___ ___ 34 ___

Play in front wheels: LF ___ RF ___ ___ 35 ___

Broken springs, torsion bars and shackles ___ 36 ___

Shock absorbers: LF ___ RF ___ LR ___ RR ___ ___ 37 ___

Condition of power steering belt ___ 38 ___

BRAKES

Pedal reserve ___ Emergency/Parking (airbrakes only) ___ 40 ___

Stopping distance and equalization ___ 41 ___

Leaks in system (including wheel cylinder) ___ 42 ___

Proper fluid level in master cylinder ___ 43 ___

Scored, cracked or contaminated drum or disc ___ 44 ___

Worn, contaminated linings or pads ___ 45 ___

Missing, broken or badly worn linkage ___ 46 ___

TIRES AND WHEELS

No tread, exposed cord, knots, non highway use:
LF ___ LR ___ RF ___ RR ___ ___ 50 ___

Mis-matched duals or tire types on same axle ___ 51 ___

Damaged wheel studs, stud holes, missing lugs ___ 52 ___

WINDSHIELD WIPERS

Proper functioning, condition of arm and blade ___ 60 ___

MUFFLER, EXHAUST, AND TAILPIPE

Leakage and secureness of mounting ___ 70 ___

WINDSHIELD AND OTHER GLASS

Approved type, badly cracked or broken glass ___ 80 ___

MIRROR

View of road to rear and proper mounting ___ 90 ___

FRONT SEAT BELTS
(1965 or later year passenger vehicles only)

Required installation ___ 91 ___

AIR POLLUTION CONTROL DEVICES (1968 and later)

Proper functioning of valves, or removal of any components ___ 92 ___

MUD FLAPS (Commercial vehicles only)

Required mounting and proper width ___ 93 ___

FUEL TANK

Leaks, secure mounting and filler cap ___ 94 ___

SPECIAL SCHOOL BUS EQUIPMENT

Flashing red lights ___ Stop arm ___ ___ 95 ___

Clearance lights ___ lettering ___ bumper ___ ___ 96 ___

Emergency door and buzzer ___ Service door ___ ___ 97 ___

Seats ___ Steptreads/Aisle mats ___ ___ 98 ___

Extinguisher ___ First aid kit ___ Flares ___ ___ 99 ___

MVI-2

STUDENT WORKSHEET #26B

DEFINITIONS FOR AUTOMOBILE GLOSSARY

Across

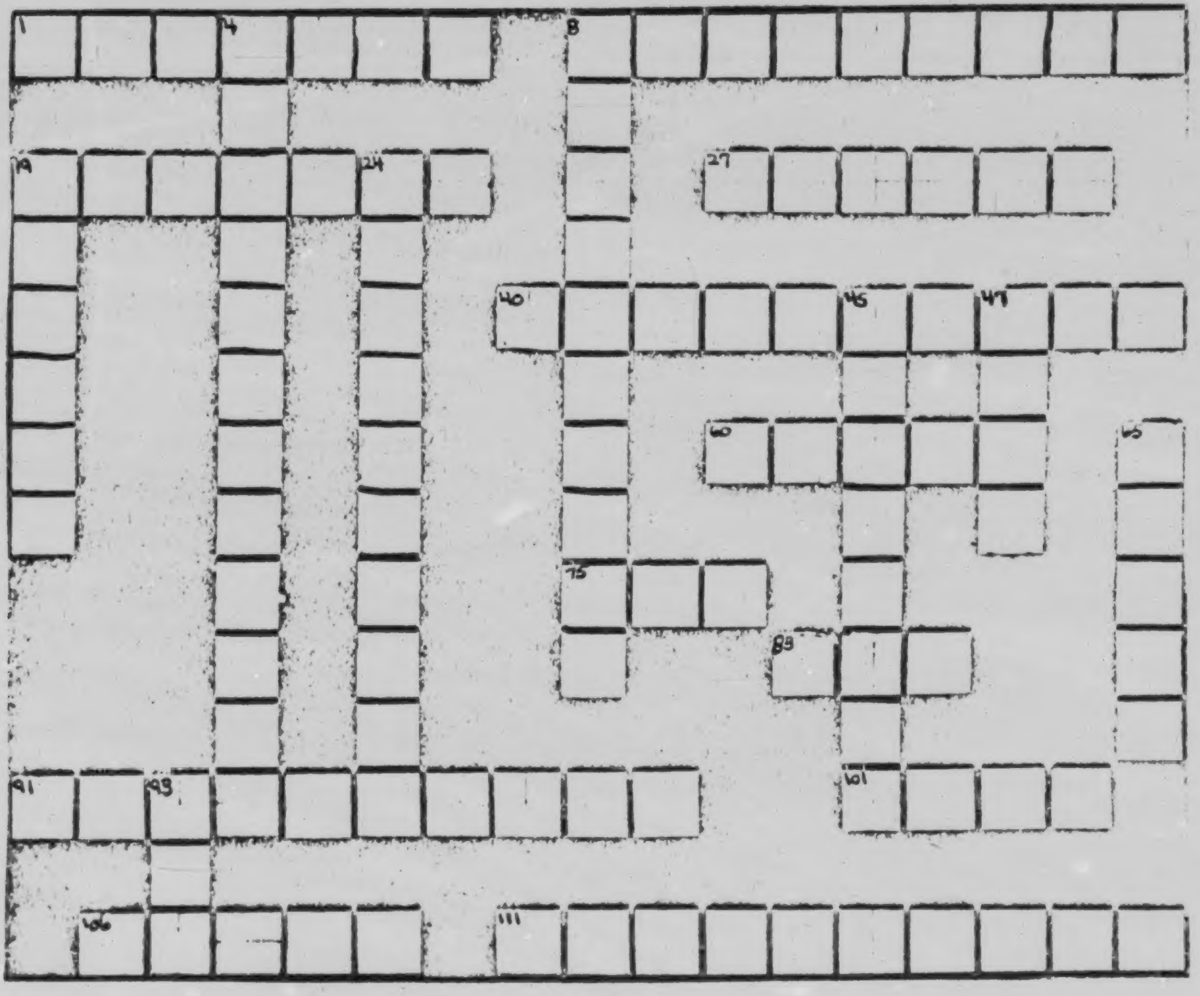
1. A storage unit for electricity received from the generator.
8. A filter at the carburetor air intake to keep out solid particles.
19. The tube that carries the exhaust gases from the exhaust manifold to the muffler.
27. A cylindrical device, closed at one end, that slides up and down in the cylinder.
40. The main shaft connecting the transmission with the rear axle.
60. One of the circular frames on which a vehicle rides.
75. A straight or compounded mineral fluid for lubricating a motor vehicle.
83. The part of a wheel on which a tire is mounted.
91. The main shaft on an engine.
101. Second word of #45 down.
106. A device in the wheel assembly to halt motion.
111. A device for delivering gasoline and air to the cylinders.

Down

4. A gearbox between the clutch and drive line for varying road speed and torque.
8. An electric generator producing alternating current.
19. The power producing unit in a motor vehicle.
24. Threaded plugs screwed into the combustion chamber wall to supply the electric spark to ignite the air-fuel mixture.
45. + 101 across
    The mechanism comprising the steering wheel, a steering column, gearbox, and the Pitman arm.
47. A shaft upon which a wheel revolves.
65. A ______________ in the driveshaft that takes care of the differences in the angle of the shaft as the axle moves up and down.
93. That which inflates a tire.

STUDENT WORKSHEET #26A

CROSSWORD PUZZLE ON AUTOMOBILE GLOSSARY



CROSSWORD PUZZLE ON AUTOMOBILE GLOSSARY

TEACHER ANSWER SHEET

1 B	A	T	4 T	E	R	Y		8 A	I	R	F	I	L	T	E	R
			R					L								
19 E	X	H	A	U	24 S	T		T		27 P	I	S	T	O	N	
N			N		P			E								
G			S		A		40 D	R	I	V	E	45 S	H	47 A	F	T
I			M		R			N				T		X		
N			I		K			A		60 W	H	E	E	L		65 J
E			S		P			T				E		E		O
			S		L			78 O	I	L		R				I
			I		U			R			83 R	I	M			N
			O		G							N				T
91 C	R	93 A	N	K	S	H	A	F	T			101 G	E	A	R	
		I														
	106 B	R	A	K	E		111 C	A	R	B	U	R	E	T	O	R

STUDENT WORKSHEET #27

WHAT ARE THE ACTUAL COSTS OF OPERATING AN AUTOMOBILE AFTER IT IS PURCHASED?

Sissy Slattery wants to drive her father's car 125 miles to a basketball game in Springfield and has saved $5 to pay the cost of the trip. She was quite amazed to hear her father say that $5 will be enough to take her about halfway there.

He explained that $5 might just exactly pay for the gasoline for the trip. His car averages 17 miles per gallon of gasoline on the highway so that the 250 mile trip will require 14.7 or, to the nearest gallon, 15 gallons of gasoline. At 34 cents per gallon the gasoline expense will be 15 x $0.34 or $5.10.

Sissy did not understand that, in addition to gasoline, her father had to take into account over a long period of time the value of the car; the cost of regular maintenance, new tires, and batteries, insurance, license, and ownership fees; and safety inspections. Mr. Slattery's estimate of $5 for one fourth of the trip means that he figures the total cost of driving his car 250 miles to be at least $20. How much is this per mile?

EXERCISES:

Compute the number of miles per gallon for each of the cars and trips listed below. Round your **answer** to the nearest mile per gallon.

		Miles Driven	Gallons Used	Miles Per Gallon
1.	CAR A	125	9	?
2.	CAR B	656	33	?
3.	CAR C	1442	80	?

4. Mr. Bouvier received his statement from the oil company that issued his credit card. He owed $35.72. He had purchased only gasoline costing 38¢ per gallon, and his car averaged 15 miles per gallon.
   a. How many gallons of gasloine had he used?
   b. How far had he driven?

Compute the cost of gasoline for each trip listed below:

		Distance in miles	Number of gallons used on trips	Cost of Gasoline Per Gallon
5.	TRIP A	525	35	32¢
6.	TRIP B	1080	60	35.9¢
7.	TRIP C	3240	162	34¢

TEACHERS ONLY - Answer Sheet for Student Worksheet #27

1. 14 miles per gallon

2. 20

3. 18

4. a. 94 gallons
   b. 1410

5. $11.20

6. $21.54

7. $55.08

STUDENT WORKSHEET #28A

HOW DO REPAIRS AND UPKEEP AFFECT THE COST OF OPERATION?

REPAIRS and UPKEEP are costly items for the car owner. Generators, starters, fuel pumps, water pumps, and carburetors sometimes need replacement. The ignition system must be tuned occasionally to keep a car running efficiently. Brakes may need to be relined every 15,000 to 25,000 miles and new shock absorbers will be needed periodically. The front-end suspension system must be realigned at the first sign of irregular tire wear.

TIRES will last from 15,000 to 40,000 miles, depending on the quality of tires and how the car is driven. Fast driving, quick starts and stops, and turning corners at excessive speeds cause extra tire wear. Tires range in price from about $50 for a set of four recapped tires to more than $300 for four of the finest premium quality tires.

BATTERIES will usually last from one to three years depending upon quality and use. A battery with a twelve-month warranty costs from $10 to $14, and with a thirty-six month warranty from $20 to $30. If you turn in your old battery when you buy a new one, the price will usually be about $2 less.

EXERCISES:

Compute the cost of each of the following repair bills:

1.	8 spark plugs	$8.80
	Points	3.27
	Condenser	1.10
	Idler arm	6.70
	Tax	.40
	Align front end	7.50
	Labor	17.00
2.	Valve cover gasket	$1.50
	Fuel pump	9.15
	Carburetor gasket	.20
	Tax	.22
	Labor	12.50

STUDENT WORKSHEET #28B

3.

Shock absorbers	$18.80
Lower ball joints	16.50
Tax	.71
Labor	19.50

4.

Points	$3.55
Condenser	1.02
Pulley	3.15
8 spark plugs	8.64
Air filter element	4.82
Tax	.42
Labor	12.50

5. Approximately what percent of the total is the labor charge for each of the repair bills listed in Exercise 1-4? Round each answer to the nearest whole percent.

6. Find the cost of a set of four tires prices at $26.50 each if the rate of sales tax is 4%.

7. Find the cost of a set of four recapped tires if each tire cost $8.65 plus federal excise tax of $1.87 and a 5% sales tax. Add a $2 charge for one extra tire carcass because only three old ones were turned in.

TEACHERS ONLY - Answer Sheet for Student Worksheet #28 A & B

1. $44.77

2. $23.57

3. $55.50

4. $34.10

5. 38%, 53%, 35%, 37%

6. $110.24

7. $45.80 (Do not charge sales tax on excise tax)

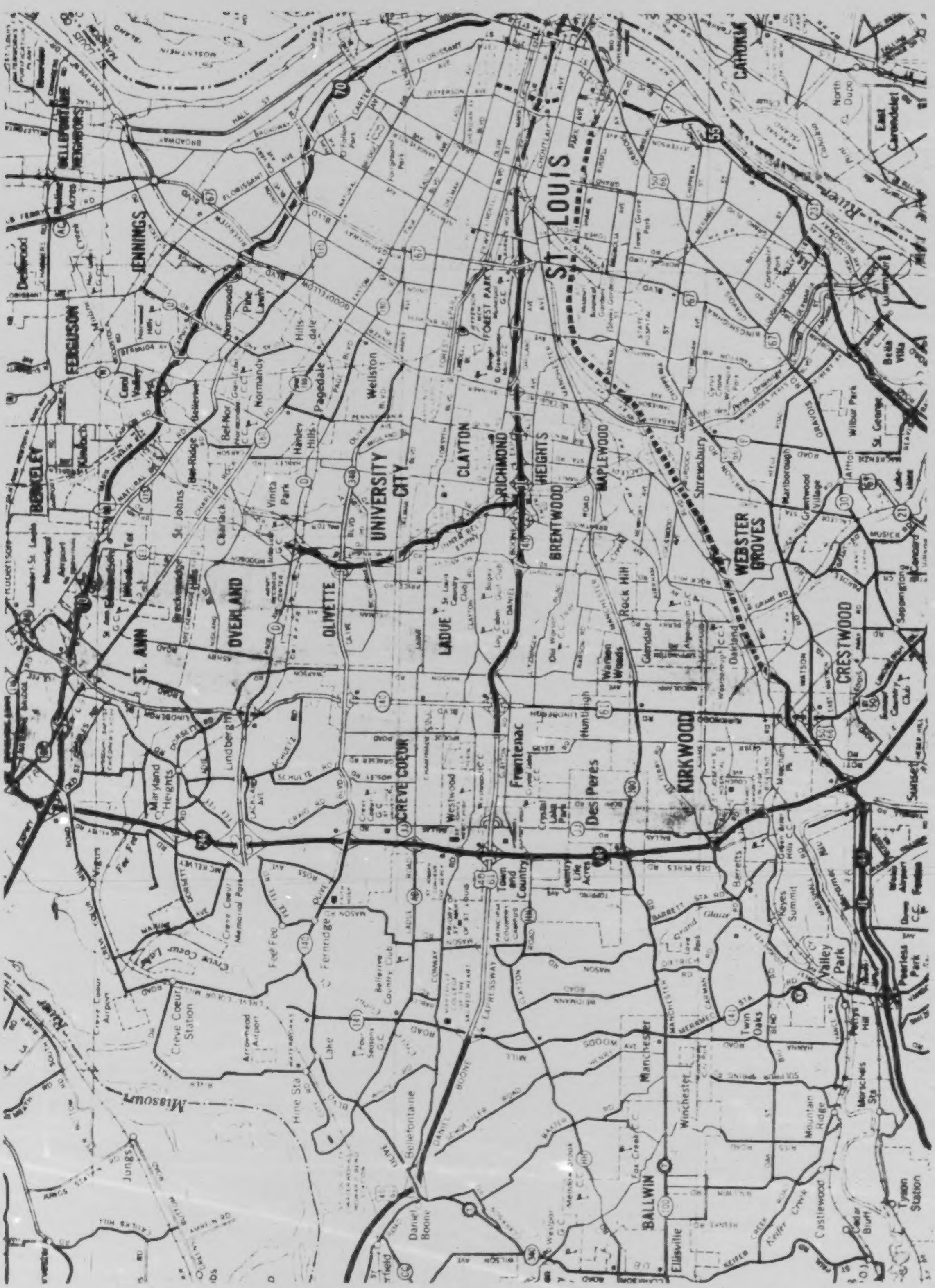
STUDENT WORKSHEET #29

IN-DEPTH ACTIVITIES ON AUTOMOBILES

Select one of the following activities for in-depth study:

1. Ask a station owner if there is a difference between high-test, regular gasoline, and low lead gasoline. Also, find out how many gallons of the above kinds of gasoline he sells in a day,week, or month period.
2. Ask a mechanic (car agency or independent owner) the advantages of keeping an automobile in good running order. (tuneups, etc.)
3. Ask a car dealer his opinion of the new anti-pollutant devices on automobiles. Also, his opinions as to how we can improve the problem of exhaust emissions.
4. Ask a dealer about the yearly Gas Economy Run contest for experts who get fabulous mileage by special techniques.

STUDENT WORKSHEET #30



METROPOLITAN ST. LOUIS AREA MAP

STUDENT WORKSHEET #31

WORD SCRAMBLE

Hidden in this letter mix-up are the names of 21 streets in the Parkway School District. Find all 21 by moving from one letter to the next. Start on any letter, and move in any direction --- up, down, across, backwards, diagonally, or what ever----

WORD SCRAMBLE

W H W E I D M A N N A H
O E O C O N W A Y Y R G
L U O L X B I G B E N D
L D D A I S F T T B Z O
O A S Y R V E S I A R C
H L M T W U E S Q L E C
G B I O O H F O S L T E
O O L N C W E R S A X T
H P L N M H E N O S A M
P P A G E I O D R S B R
O M F E J T O A K Y O S
R E L T T E O H C S Z A

The 21 missing streets are:

Hanna
Manchester
Page
Woodsmill

Ladue
Clayton
Hog Hollow
Schoettler

Mason
Baxter
Ballas
White

Henry
Fee Fee
Ross
Bopp

Oak
Big Bend
Weidmann
Olive
Conway

STUDENT WORKSHEET #32

LOCATING THE ARTERIES THAT LINK PARKWAY WITH ST. LOUIS

Using one of your St. Louis road maps, complete the following exercises:

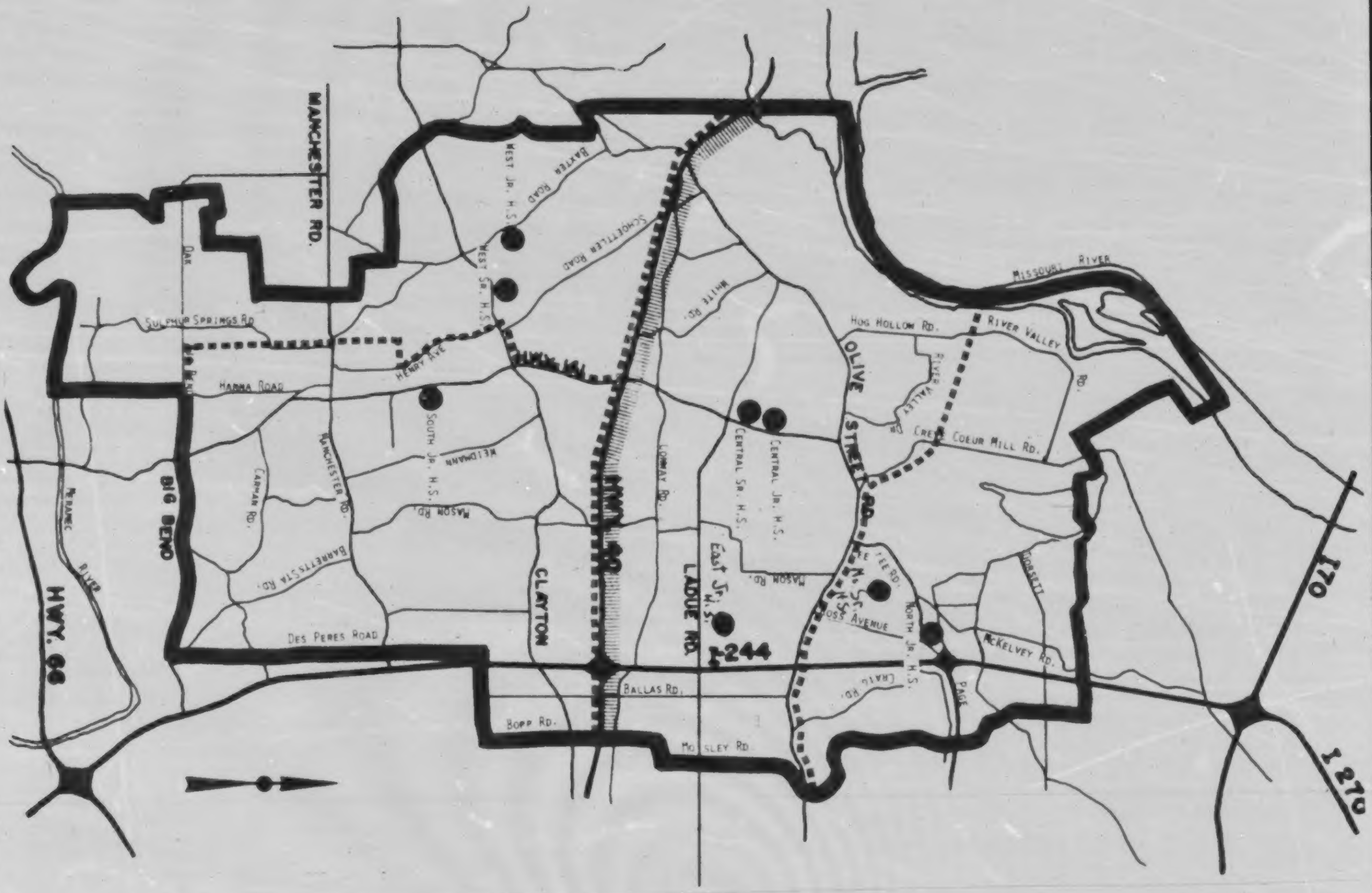
1. Using a red pen, draw an outline of the Parkway School District. Shade this area LIGHTLY in red.
2. Using a yellow marker, trace the following arteries which "cut through" the Parkway area:
   a. Interstate 244
   b. Highway 40
   c. Manchester Road
   d. Page Avenue
   e. Olive Street Road
   f. Clayton Road
3. Using a green marker, trace the following arteries, which though not inside the Parkway area, are used by Parkway citizens as they travel to St. Louis:
   a. Interstate 70
   b. Lindbergh Boulevard
   c. Interstate 44 (Highway 66)

Using your second St. Louis road map, complete these exercises:

1. Using a red pen, outline the Parkway School District.
2. Place a green circle around the location of your school.
3. Place a red star at the site of your school.
4. You are in charge of setting up a series of field trips for your school. Using a green marker, draw your route from school to the following destinations:
   a. St. Louis Art Museum
   b. Powell Hall
   c. Soulard Market
   d. Lambert-St. Louis International Airport
   e. The Arena
5. You are at home and you receive a call from your cousin Mildred who lives in Dubuque. She is at Northwest Plaza and wants to come visit you. Write down the directions you would give Millie so that she would arrive at your home.

STUDENT WORKSHEET #33

PARKWAY AREA



1. **West Junior High School has a basketball game with** North Junior High. Your friends ask you the best route to take from West to North. Trace the directions you would give them.

2. A friend is to pick you up after school (use your own school). He calls you, stating that he is lost at Big Bend & Hanna Road. Direct him to your school.

3. You have a friend who attends North Junior High and another who attends South Junior High. You decide, to save time, that you will meet these two individuals half-way between the two schools. On the map, locate the meeting point for the group.

STUDENT WORKSHEET #34

SHOULD THE STATE HIGHWAY COMMISSION TAKE PRIVATE LAND FOR PUBLIC ROADS?

George Roads owned a trace of land in Warren County, Missouri adjacent to U.S. Highway 40. A motel was built along Highway 40 on George's property with direct access to the highway from the motel parking lot. When the state of Missouri started to build Interstate 70 through Missouri and widen and improve the roadway of Highway 40, they acquired part of the land upon which the motel was built by the law of eminent domain. George and other owners of the motel became angry with the settlement that they received from the State Highway Commission.

The part of the property that was taken was along the eastern side of the motel property and a triangular piece of land at the northeastern corner of the motel property. The land taken along the eastern side and the corner were to be used to improve the county road leading to the outer road to limited access I-70. The motel owners and customers no longer had direct access to the new highway, but had to drive either three miles east or three miles west along the outer road to gain access to I-70. They felt, therefore, that their business would be hurt.

The motel owners had been paid for the land that the State Highway Commission had taken, but the highway commission refused to pay the owners any further money because they no longer had direct access to I-70. The highway commission's stand was that further damages would be necessary if the motel had no access to I-70 at all, but they did have access to the outer road which gave access to I-70. Because they had access to the outer road, the motel owners were not entitled to further damages.

The motel owners brought a suit against the highway commission for the above reason and tried to get a court decision in their favor. A Warren County court did award further damage to the remaining property because of loss of direct access to the new highway. The highway commission appealed the case to the Missouri Supreme Court.

ACTIVITIES:

1. Read the case and decide the issue.
2. Read the two sections from the Missouri Constitution's Bill of Rights on the attached page. Were the motel owners' constitutional rights violated? Why or why not? (Be specific!)

CONSTITUTIONAL QUESTION:

Does the constitution require that compensation be made to Mr. Roads for loss or damage due to the lack of direct access to the highway?

ARTICLE I, Section 26:

COMPENSATION FOR PROPERTY TAKEN BY EMINENT DOMAIN--CONDEMNATION JURIES--PAYMENT. "That private property shall not be taken or damaged for public use without just compensation. Such compensation shall be ascertained by a jury or board of commissioners of not less than three freeholders in such manner as may be provided by law: and until the same shall be paid to the owner, or into court for the owner, the property shall not be disturbed or the proprietary rights of the owner therein divested."...

ARTICLE I, Section 27:

ACQUISITION OF EXCESS PROPERTY BY EMINENT DOMAIN--DISPOSITION UNDER RESTRICTION. "That in such manner and under such limitations as may be provided by law, the state or any county or city may acquire by eminent domain such property, or rights in property, in excess of that actually to be occupied by the public improvement or used in connection therewith, as may be reasonable necessary to affectuate the purposes intended, and may be vested with the fee-simple title thereto, or the control of the use thereof, and may sell such excess property with such restrictions as shall be appropriate to preserve the improvements made."

STUDENT WORKSHEET #35

POLLUTION PRODUCED BY THE AUTOMOBILE

To get some idea of the pollution produced by an automobile, tie a clean white cloth over the exhaust pipe and run the engine for five minutes. Collect the deposits coming from the automobile. Caution: DO NOT BREATHE THE GASES COMING OUT OF THE EXHAUST;! ALSO, WATCH OUT FOR A HOT EXHAUSE PIPE!

Try different cars (using cotton, gauze, etc.)

Label and save all your filters, Keep track of where and when you collected the samples.

Group your samples by putting them in rows from very light (few pollutants) to very dark (many pollutants).

Try this activity on a foggy day when visibility is reduced. Note the differences, if any.

Keep in mind:

1. Keep track of the amount of time that you had the motor running.
2. Keep tract of the weather conditions. Was the wind blowing, or was it raining?
3. Did you always use the same kind of filter?

What's In A Breath Of Fresh Air?

Here are some facts of life and breath about city air pollution.

Although there are more than 100 varieties of air pollution, in practice pollutants are usually divided into two classes—*particulate matter* and various *pollutant gases*.

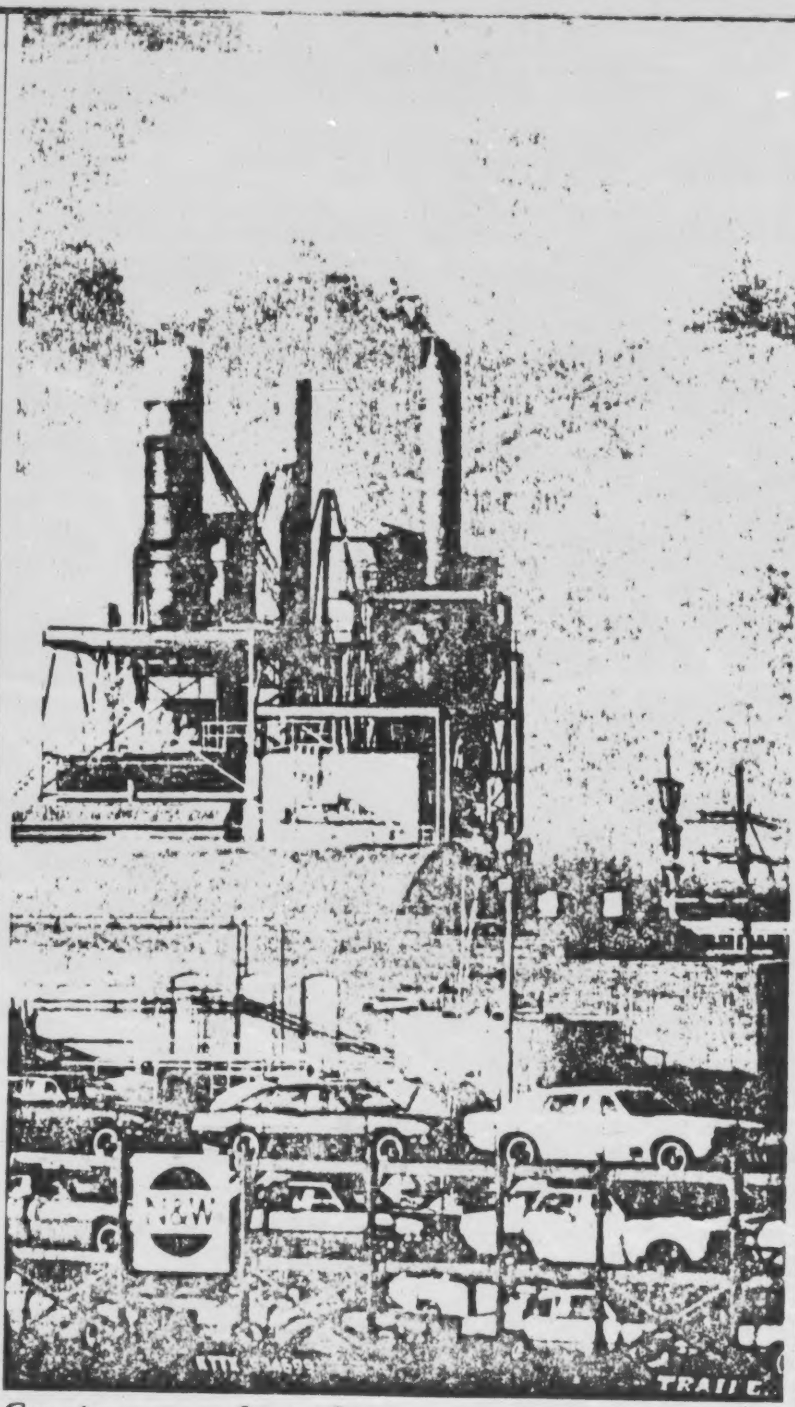
Particulate pollution includes dust, mist, ash, smoke and fumes. In cities, particulate pollution might come from grinding or pulverizing materials to make cement, or from burning fuel in an automobile, diesel truck, home or power plant.

Pollution not only includes particulates, but two pollutant gases—sulfur dioxide and nitrogen dioxide. Sulfur dioxide—a mild respiratory irritant linked to several health problems—usually results from burning fossil fuels, such as coal and oil, for heat or to generate electricity.

Another source of smother is nitrogen dioxide. Not only is it dangerous in itself, but in the presence of sunlight—along with the proper temperature range, humidity and suitable aerial mixing—can form photochemical smog. Nitrogen dioxide at concentrations found in urban air is colorless; only when viewed from a distance, as when one looks through polluted air toward the horizon, does it take on a reddish or brownish hue. For example, urban residents cannot see NO_2 gas escaping from automobile exhausts.

Cleanliness, in air pollution, too, may or may not be next to godliness. But in determining America's 10 most breathful cities, "cleanliness" will be determined by average annual air pollution. That statistic is useful, but suffers the same flaws as "average temperature." A city with an average temperature of 68° may still have several 4° and 105° days. Similarly, a city with "good" average air pollution may have severe problems several times during the year.

Remember too that all air pollution is a function of just three elements—the amount of pollution going into the air, the amount of air space that is being polluted, and wind and weather conditions.



Great masses of people living closely together inevitably cause pollution—the more people, the more electricity is needed, the more cars are driven, the more factories, the more ugly, smelly and unhealthy the air.

ing plants," says Nancy Johnson, acting president of the Air Quality Coalition of North Central Texas. The 800-member coalition, together with the Dallas Respiratory Health Association, has made lead-particulate pollution abatement a priority, recently lobbying for a city council-passed bill which will require gas stations to sell lead-free or low-lead gasolines by June 1973.

Seattle

With its spectacular views of mountains and waterways, it would be a shame if Seattle had to live with polluted air. This was the thought on many minds when, in 1967, the state of Washington established its first regional air pollution control authority (the Puget Sound Air Pollution Control Agency) to clean up an increasingly fouled atmosphere in the Seattle area. Maybe, it was hoped, with a little cooperation, citizens could once again enjoy every day the view of the mountain that looks like a scoop of vanilla ice cream—Mount Rainier.

The first concern of the regional agency was not Seattle, but Tacoma—an industrial city about 50 miles to the south, sometimes unflatteringly referred to as the armpit of the Northwest. The agency's first target there was the American Smelting and Refining Company, which, the agency estimated, was responsible for more than two-thirds of sulfur dioxide pollution in its four-county region! Following lengthy negotiations and a few court appearances, the company agreed to an abatement schedule which will see a 51 percent reduction of emissions by June and a 90 percent reduction by 1975. It was enforcement activity like this that the agency claims reduced total emissions in its region by 8,400 tons in 1970 and almost 17,000 tons in 1971. In 1971 the region's particulate pollution—which had been creeping up until 1970—fell to a seven-year low, well below the 1977 federal standard.

One nagging environmental problem in Seattle is vehicular pollution. Although voters recently approved financing to bolster the city's deteriorating bus services, residents have consistently defeated mass transit bond issues. The city's short downtown monorail—built for the 1962 Seattle World's Fair as a model for urban rapid transit—has never been expanded. It continues to have more utility as a tourist attraction than as a people mover.

Memphis

Memphis may soon be able to boast about a lot of "clean" industry. It hasn't always been that way. Memphis, the world's largest hardwood lumber center, once could hardly boast of air shrouded in plumes of black smoke emitted from its wood processing and furniture industry. "That's not really a problem anymore," says Howard Vogel, Ph.D., a pharmacology professor at the University of Tennessee Medical School and a founder of the Memphis Environmental Action Council. "The sawdust and other wood scraps the companies used to burn are now made into other products, like charcoal."

Other examples of industrial cooperation abound: One electro-metallurgical plant recently spent four-and-a-half million dollars cleaning up; International Harvester, the farm-equipment manufacturer, recently invested two-and-a-half million dollars in pollution-control equipment at its plant.

Built on a bluff on the banks of the Mississippi River, Memphis enjoys good geographic and meteorological protection from air pollution. But in another sense some environmentalists say the city is not well protected at all—they claim it is being assaulted by the highway lobby.

"Our major environmental problem right now," says Dr. Vogel, "is our fight against Interstate 40." The opposition is to put the superhighway through Overton Park, presently home for a zoo, art academy and an athletic playfield. Despite court opposition by a citizens' group which resulted in a favorable ruling from the U.S. Supreme Court, the road could still be built through the park. But fighting the road has become the *cause célèbre* of many Memphis environmental organizations. The League of Women Voters, for example, is planning to take citizens on bus tours of proposed highway routes, including Interstate 40. Three years ago a similar "workshop on wheels" took residents on a tour of different industrial sites of air pollution.

Columbus

Columbus, Ohio, like most of the other cities on the 10 cleanest list, got there because of how and where it grew up. The state capital, Columbus is situated on well-ventilated rolling plains; its economy rests primarily on banking, insurance, electronics, and state and federal employment.

Another reason for Columbus' good air quality has been the city's early activity in eliminating sources of pollution. Abatement efforts date back to the 1930's, when the first smoke control codes were adopted, designed to reduce soot from coal-fired home furnaces. The campaign has had dramatic results: most homes converted to natural-gas-fueled heating systems.

Ironically, the local government's clean-up campaign did not, until recently, affect the city's own municipal light plant, which was sending plumes of black smoke into downtown Columbus as late as the end of 1972. The city is now, however, in the final stages of converting the generator's coal-fired boilers to natural gas.

Early efforts to control smoke may not have been an unqualified blessing for Columbus. Critics have charged that the department of safety—which has overseen the abatement and boiler inspection program—has concentrated too much on smoke, ignoring invisible pollutant gases. But Columbus is not entirely smoke oriented: even as a mayoral committee studies the best approaches to ridding the city of noxious invisible gases, the city's citizens are involved in a related environmental area—recycling garbage.

This environmental problem in Columbus is shared by every community in the country—disposing of the town's garbage. The city is now dumping its 950-ton load of daily garbage in a landfill, but like other municipalities it is looking at other ways to handle its trash. One alternative is recycling, and although the municipality hasn't yet embraced the idea, an enthusiastic group known as the Waste Watchers has.

Waste Watchers was born as a result of a telephone call to the Ohio State University radio station in the spring of 1971. The caller wanted to know where she could take glass, cans and paper to be recycled; some quick research turned up only once center and that was out of town. The station decided Columbus needed a center of its own and appealed for volunteers to

(Continued on page 69)

proving. The Bay Area Air Pollution Control District, created in 1955 as one of the first regional air pollution agencies in the country, has instituted a number of tough measures which have had noticeable effects on air quality. The measures include direct controls of particulates, lead, nitrogen dioxide, sulfur dioxide, sulfuric acid and other emissions, and a permit program requiring anyone wishing to build a facility with air pollution potential to first submit plans and specifications to the District staff.

The Bay Area has many other environmental innovations to its credit. The area's nearly completed $1.3 billion Bay Area Rapid Transit system is the largest locally financed public works project in the country, and is giving residents an attractive alternative to traffic snarls, lead fumes and rush hour monotony. And cars carrying three or more passengers are being offered free crossing on the Golden Gate Bridge to encourage group riding and less congestion, while toll-paying drivers have been given free bus tickets. As yet BART will not be operative to downtown San Francisco for at least a year. Other innovations in the Bay Area include: test runs of a virtually pollution-free steam bus on the streets of Oakland and San Francisco, and a unique landfill arrangement where the Bay City's daily load of 2,000 tons of trash is hauled 35 miles to the south where it is being used in the development of a major shoreline park.

Boston

Boston, the only east coast city on the 10-cleanest list, shares many of the environmental advantages of San Francisco. It gets excellent coastal ventilation, with westerly winds blowing most of its pollutants out to sea. Like San Francisco it was among the first cities in the country to adopt air pollution ordinances. Boston also shares an environmental consciousness with its California counterpart: While San Francisco can lay claim to organizations like the Sierra Club, Boston produced naturalists like Thoreau and Emerson. Even today, "There are probably more environmentalists per square yard in Boston than in any other part of the country," comments one official at the Boston Tuberculosis and Respiratory Disease Association.

Boston's progress in reducing air pollution is the result of standards it adopted for controlling sulfur dioxide emissions. Unlike San Francisco and San Antonio, which depend on natural gas for power generation, Boston depends on coal and oil to fuel its electric power stations. The sulfur dioxide created by these power plants is the result of the burning of coal and oil, usually stated as sulfur-bearing. Restricting the sulfur content of the fuel proportionately reduces sulfur dioxide pollution. Since Boston initiated its restrictions, sulfur dioxide levels have plummeted. They're still not as good as San Francisco's, but they're getting closer.

With sulfur emissions under control, Boston's major environmental problem is the car. "To meet federal standards for 1977," says David Standley, executive director of Boston's Air Pollution Control Commission, "we may have to enforce a 25 percent reduction in auto travel. Right now I just don't see any other way." Standley's commission has made some progress in the transportation area, opposing the construction of certain highways through the city, and getting the city council to pass an ordinance prohibiting "unnecessary foreseeable idling" of cars and trucks, a measure primarily aimed at standing taxis and unloading trucks.

In the process of pollution-fighting, Standley has attracted the unqualified support of many local environmental groups—an unusual position for a public official. "David's been a real prize," says James MacKenzie, Ph.D., a member of the activist Union of Concerned Scientists at the Massachusetts Institute of Technology. "Since he's been commissioner the situation here has changed from one of struggle to cooperation. He's just very effective."

Toledo

On the surface, Toledo, situated on the southwest corner of polluted Lake Erie, has many things going against its air. The number one U.S. producer of auto parts, Toledo is also the glass manufacturing capital of the nation. Large petroleum refineries are located in and around the city and the 28 million tons of coal and 2 billion tons of grain handled at Toledo's Maumee River port are added sources of particulate pollution. So what's keeping the city clean?

"One reason," suggests Paul Findlay, director of the city's air pollution agency, "is that we've had tremendous cooperation from industry. Many companies that normally would be problems have cleaned up." Citing several grain elevator storage companies as examples, Findlay says they recently spent more than $3 million on equipment limiting their particulate pollution.

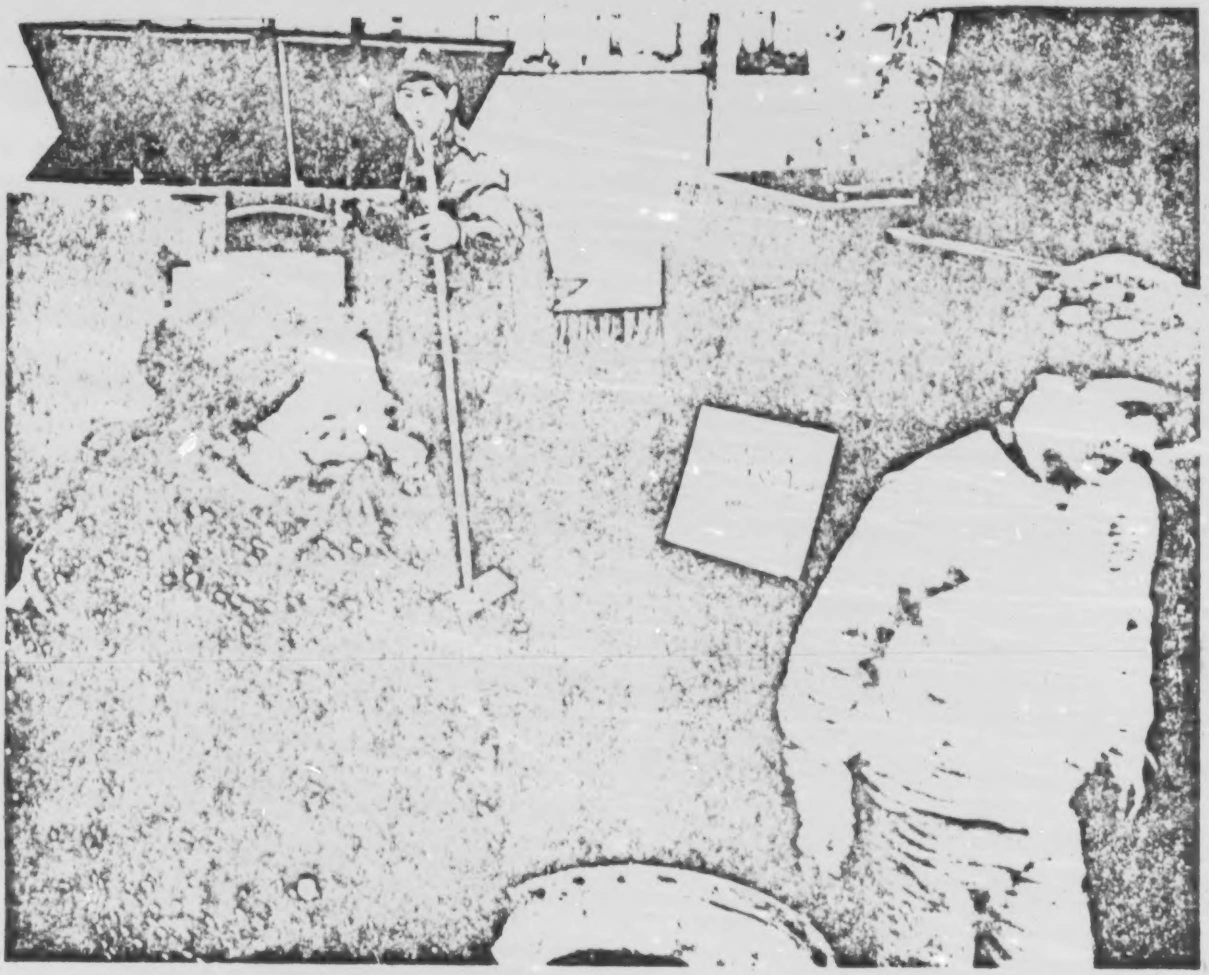
But Toledo, like the other nine cities, has much more going for its air than abatement equipment. Bordering the southwestern shore of Lake Erie, the city can usually count on nature to clear the air. Although its nitrogen dioxide and sulfur dioxide problems are aggravated by a nearby coal-fired electric generating station, some relief may be in sight for particulate pollution with the expected 1975 opening of the Davis-Besse nuclear plant on the shores of Lake Erie.

Toledo's citizens are also taking a role in improving their environment. Three years ago, for example, around the time of the first Earth Day, two Toledo housewives decided to start the Environmental Clearing House. The organization, which is now supported by a grant from the U.S. Department of Health, Education and Welfare, publishes a regular issue-oriented environmental newsletter, maintains files on the environmental voting record of legislators, and oversees a number of educational activities. Their latest accomplishment: organizational support for the Friends of the Maumee, a new civic group trying to clean up a very polluted river.

Dallas

Dallas, like its more polluted Texan brother, Houston, is one of the boom towns of our time. The agribusiness capital of the Southwest, Dallas in the last 10 years has increased its population by a third to more than 840,000. The city shares many of the air pollution advantages of Texas—large and local supplies of natural gas, and low population density—and although it is located in a basin, steady winds from the Gulf of Mexico usually keep it free of temperature inversions.

Not that Dallas has no air pollution problems. Of particular concern to residents are several plants which reclaim lead from products such as exhausted automobile batteries. "We're now in the process of conducting blood-lead tests in two-to-six-year-old children, who live near the lead smelt-



One environmental problem is shared by every community in the country—disposing of the town's garbage.

Texas Environmental Coalition she is lobbying at the state legislature for bigger issues, including a statewide comprehensive transportation plan.

Even in clean air San Antonio, Mrs. White says nitrogen dioxide emissions from automobiles (the nation's number one polluters) are a problem. "Sooner or later," she predicts, "we're just going to have to come up with a plan that will reduce the car problem."

San Francisco

Should anyone doubt the importance of natural ventilation to clean air, San Francisco's air quality can supply some convincing evidence. With a population density second only to Manhattan, the city nonetheless enjoys the cleanest air of any west coast city; it even came close to meeting 1977 federal air quality standards in 1970 for every pollutant except nitrogen dioxide. The city's good fortune is the result of a steady flow of cool, clean marine air which blows in from the Pacific Ocean. As well as cleansing the air, the sea breeze keeps the city's atmosphere relatively free of temperature inversions, a condition created when a layer of warm air traps cooler air with all its pollutants beneath it.

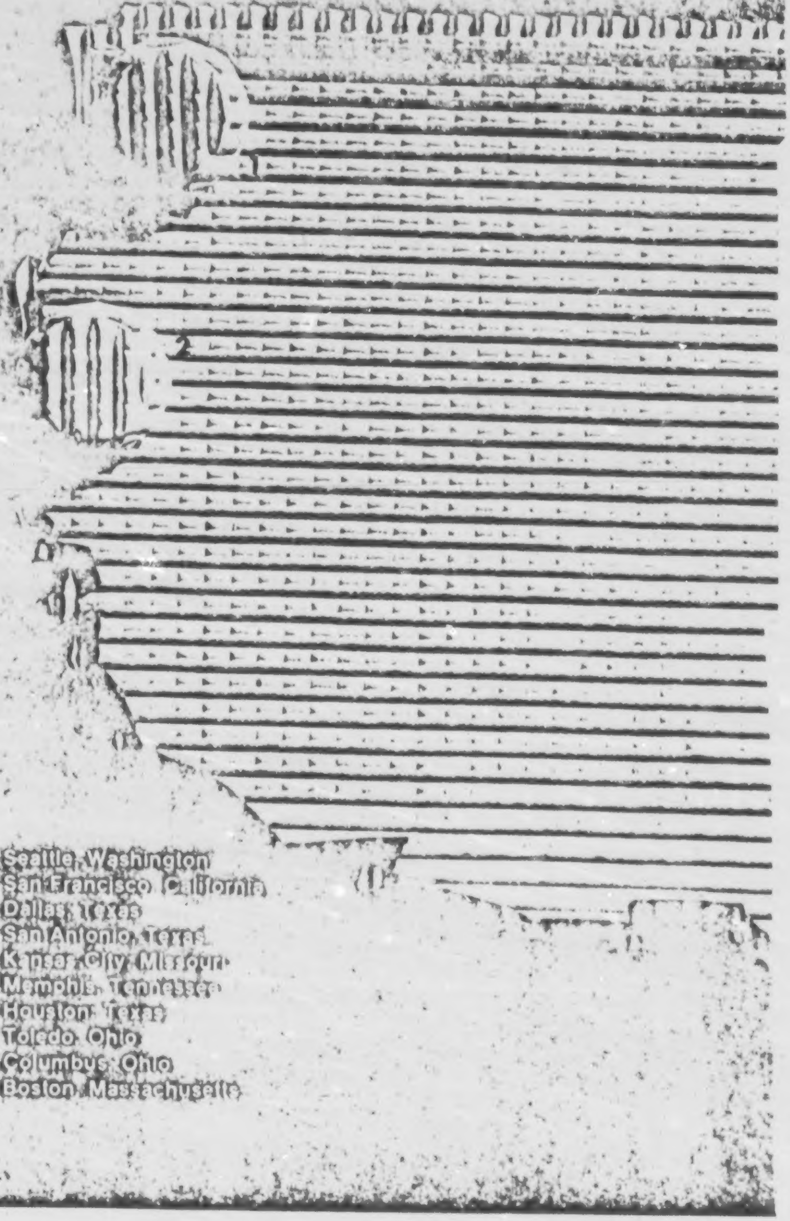
While San Francisco's winds may be popular among residents living around the city's steep cliffs and lovely vistas, it is not as appreciated by neighboring communities to the east. The same wind that carried away the aerial garbage of the Bay City often contributes to conditions which trap pollutants in areas such as Livermore Valley. Not only are the meteorological conditions less favorable inland, but the atmosphere there must contend with many more pollutants, coming from local oil refineries, power stations and automobiles.

But air quality in the entire Bay Area—not just San Francisco—is an

OUR 10 CLEANEST CITIES

What we can learn from the struggles to keep their air unpolluted

By Peter Frishauf



1. Seattle, Washington
2. San Francisco, California
3. Dallas, Texas
4. San Antonio, Texas
5. Kansas City, Missouri
6. Memphis, Tennessee
7. Houston, Texas
8. Toledo, Ohio
9. Columbus, Ohio
10. Boston, Massachusetts

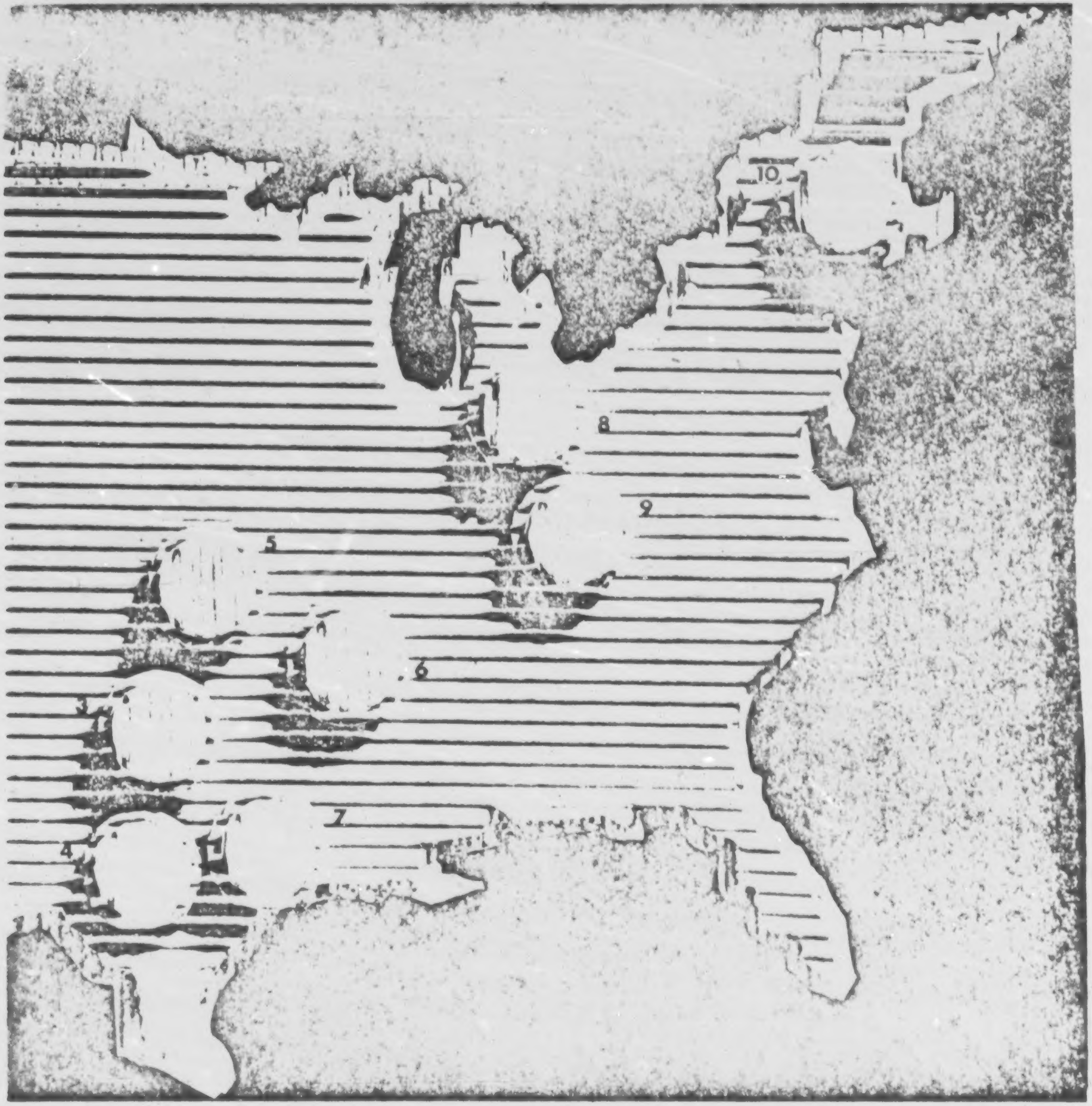
America's sprawling cities are the most air-polluted parts of our country—because, being megalopolises, they are people-polluted.

Great masses of people living closely together inevitably cause pollution—the more people, the more electricity is needed, the more cars are driven, the more factories, and the more ugly, smelly and unhealthy the air. But just as pollution is most concentrated in cities, so is the fight against it. Cities, as more and more of them are proving, don't have to be polluted. Here's the story of 10 cities that probably have the cleanest big-city atmospheres around. They're 10 big cities that have air that, if not squeaky clean, is the least dirty of any of our urban centers. The following report will detail how they got that way and are staying that way, and, most important, it will suggest what your city can do.

The ratings come from the Mitre Corporation, which, on contract to the Environmental Protection Agency (EPA), determined a National Air Quality Index combining particulate matter and noxious gases to obtain a coefficient of air pollution, based on the secondary ambient air quality indiçes established by the federal government. (For the rating procedure, see the box on page 25.)

San Antonio

San Antonians probably would not



be surprised to learn they live in the cleanest big city. Located at a meeting of plains and hills in South Central Texas, San Antonio has all the elements necessary for good air: excellent natural ventilation from the nearby Gulf Coast, low population density (the city has practically no urban area), and minimal industrial pollution. About three years ago San Antonio did have a problem from three cement factories which paved its blue skies with clouds of white particulate dust, but the problem has been eliminated with the installation of electrostatic precipitators in the factories and industrial ventilation throughout the plants that traps fugitive dust from other processes. Otherwise the city has almost no industry; its economy depends on its commercial and financial districts and several area military bases. Because of plentiful local sources of clean-burning natural gas to heat homes and generate electricity, sulfur dioxide pollution in the area is almost nonexistent.

With all its clean air, San Antonio has another feather in its environmental hat in the person of Char White. Three years ago when Mrs. White moved to San Antonio from Washington, D.C., she founded Citizens for a Better Environment, a group which was soon operating six recycling centers. Now, as president of the

STUDENT WORKSHEET #36g

BONUS ACTIVITIES FOR THE ABOVE AVERAGE STUDENTS

1. List the ten cleanest cities in the United States and tell how they achieved this distinction.

STUDENT WORKSHEET #37

CHOICE OF INDIVIDUAL ACTIVITIES BY THE STUDENTS

Select any two (2) of the following activities:

1. Take some photographs of things which cause the air to become polluted. Include chimney smoke, auto exhause, rubbish fires, etc. Exhibit these photos on a large sheet of cardboard. Indicate their significance or causes of air pollution.

2. Exhibit a chart showing the chemical composition of air and of polluting particles.

3. Present in writing your conclusions about the problem of air pollution in your community.

4. Write to your nearest air pollution control center for information on local air pollution.

5. Consult your local weather bureau for information concerning fog and smog.

6. Secure a large strip of white cotton felt or batting. Tack it to a board and cover four-fifths of the cotton-covered board with another board. Each day uncover another one-fifth of the cotton. Observe how the visible impurities increase each day. Determine the apparent density of the polluting elements by examining each section of the cotton under a magnifying glass and comparing them.

7. Investigate any past periods of smog that have occurred in your locality.

8. Check the laws in your community to see if there are any which govern the emission of smoke and other pollutants. Should there be additional laws? Do you expect new laws to be passed in your community in the near future?

9. Make up a story about a person overcome by carbon monoxide. Be sure to point out the conditions where dangerous levels of carbon monxide are likely to be found.

10. Check with your parents as to how many gallons of gasoline their car(s) use per day or week. Extend this investigation to a year. Compare your family's usage of gasoline with that of others in your neighborhood.

STUDENT WORKSHEET #38

OUR NOISY WORLD

Description of Sound	Rating in Decibels (dB)	Typical Examples
Threshold of hearing	0	Quiet church Still night in country Soundproof room
Very faint	10	
	20	
Faint	30	Public library Country road Quiet conversation Rustle of paper Whisper
	40	
Moderate	50	Large shop Average office Quiet automobile Quiet office Average house
	60	
Loud	70	Noisy office Suburban train Typewriters Radio set full volume Average factory
	80	
Very loud	90	Subway Busy street Noisy factory Loud public-address system
	100	
Deafening	110	Thunder Gunfire Pneumatic drill Stream whistle Large machine shop
Threshold of pain	120	

Source: Our Noisy World
John Gabriel Navarra

1

ACTIVITY

Working in groups, add at least 3 typical examples to the chart given above. Be ready to defend your answers as you compile your findings with the class.

STUDENT WORKSHEET #39

THE AUTOMOBILE AND NOISE POLLUTION

The greatest noise offender is the automobile. Inside the vehicle, the sound of wind can make conversation difficult or impossible. Tires improperly designed or constructed can cause thumps, squeals, and whining noises. Other moving parts on a car add to the overall noise level inside the car.

By far the most serious automobile noise problems are the sounds heard outside the vehicle. These sounds include engine noise, exhaust sounds, sounds from tires making contact with the pavement, horns honking, and tires skidding.

ACTIVITIES

1. While riding in a car for at least ten minutes, list or record the sounds that you hear and explain their intensity. (example: passing truck - moderate noise created.)

2. Stand on a street corner for at least 10 minutes and follow the same instructions as in Activity #1.

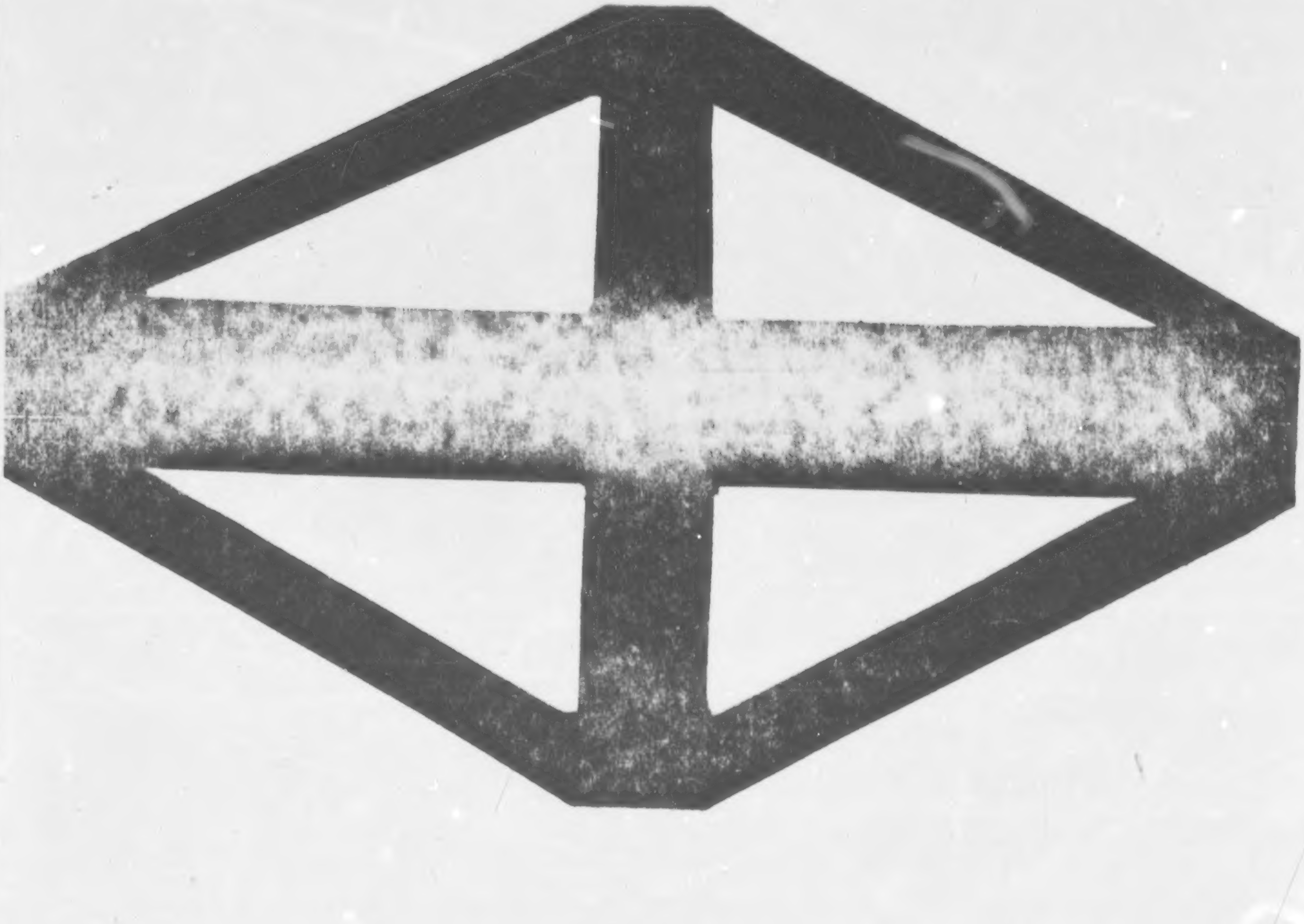
3. What conclusion can you make about the amount of noise felt by the occupants of an automobile and the amount of noise created by an automobile?

STUDENT WORKSHEET #40

ADDING TO THE AESTHETICS OF THE HIGHWAY

Given the area below, design a landscape scheme showing trees, shrubs, bushes, and flowers that will enhance the beauty of the highway, cut down on noise pollution, and increase the safety of the interchange.

You may create your scheme in a three-dimensional model, a poster, or any other means you can devise. REMEMBER, your only limitation is to keep the same ratio as the dimensions in the drawing below.



STUDENT WORKSHEET #41

IDEALISM VS. REALISM

Follow-up to Student Worksheet #40. Look at the plans you created for the interchange in the activity that required you to landscape, etc. List at least 10 problems that would keep the highway authorities from following your plan. Be realistic! Think this through, then, rework your plan in sketch form into a workable and affordable design.

STUDENT WORKSHEET #42

RATING OF BILLBOARDS

Copy (draw, sketch, photograph, etc.) ten billboard signs. Study the pictures and slogans on each. Then give a rating for each sign: 1. excellent; 2. good 3. average; 4. poor; or 5. bad.

Redesign your lowest rated sign so that it could then have a good or excellent rating.

STUDENT WORKSHEET #43

INTERVIEW WITH A PERSON WHO HAS HAD PROPERTY DAMAGE

Date of Interview

Person Interviewed

Address of Person Interviewed

Phone

Date of Accident

Time of Accident

Describe Damage to Property

Cost to Repair

Cause of Accident

Comments by Person Interviewed

STUDENT WORKSHEET #44A

A FUNNY THING HAPPENED ON THE WAY TO AUNT MARTHA'S

Your Missouri Driver's License number is L816-4444-7238-6798. Last Thursday at 9:00 A.M. you were driving your Aunt Martha Washington's 1937 MG convertible (Missouri plate #PU-000) down Schoettler Road in unincorporated St. Louis County. Since it was raining, you were driving 25 miles per hour as you headed for your aunt's home at #16 Mt. Vernon Way, Chesterfield.

As Auntie's MG (whose motor number is 43-48412) turned the corner of Conway and Schoettler (1 mile from Chesterfield), a 1973 Dodge Duster hardtop (1973 Illinois plate #IOU-222) owned and driven by Gary Hartless (born 3-10-46 and who lives at #6 Versailles Palace Place, Fenton, Mo.) ran through the stop sign and crashed into the front of your car. Gary (Illinois Driver's License number 661-83-489) ran into the front right fender and wheel and caused $879.99 damage to your car. The collision totally demolished ($1568.27) the front end of the Duster.

The accident caused both cars to push through a fence into a barn lot where a cow was killed ($678), five golden hens decapitated ($17 each), and a partridge in a pear tree was obliterated(partridge 50¢; pear tree $18.71). The fence ($471.56) and animals belonged to Admiral William Halsey of 1313 Mockingbird Lane, Chesterfield.

ACTIVITY

Fill out the "Report of Motor Vehicle Accident" form of the following page with the information given above. This form is an actual copy of the form you must fill out and mail to the Director of Revenue--Safety Responsibility Unit in Jefferson City within 10 days after an accident.

STUDENT WORKSHEET #44B

REPORT OF MOTOR VEHICLE ACCIDENT

ANSWER FULLY EVERY QUESTION

STATE OF MISSOURI
DIRECTOR OF REVENUE – SAFETY RESPONSIBILITY UNIT
Post Office Box 506, Jefferson City, Missouri 65101

REPORT OF MOTOR VEHICLE ACCIDENT

(READ REVERSE SIDE BEFORE COMPLETING REPORT)

The driver or owner of a vehicle which is in any manner involved in an accident resulting in death or bodily injury, or in damage to the property of any one person in excess of $100, shall complete and send this form to above address as soon as possible but not later than 10 days after such accident.

Case No.

DO NOT WRITE IN THIS SPACE

ACCIDENT IN CITY

ACCIDENT OCCURRED IN ________ CITY ________ COUNTY

ON ________ STREET AT OR NEAR ________ CROSS STREET

Inside City Limit ☐
Outside City Limit ☐

ACCIDENT IN COUNTRY

ACCIDENT OCCURRED ON ________ HIGHWAY NUMBER OR ROAD NAME IN ________ COUNTY

AT ________ NAME INTERSECTION, OR TELL DISTANCE AND DIRECTION FROM NEAREST TOWN, HIGHWAY JUNCTION, CROSSROAD, RAILROAD CROSSING.

EXACT DATE OF ACCIDENT ________ AT ________ ☐ A.M. ☐ P.M. DAY OF WEEK ________

Daylight ☐ Dusk ☐ Dark ☐

WEATHER: Clear ☐ Rain ☐ Snow ☐ Fog ☐

YOUR VEHICLE – No. 1 ☐ MALE ☐ FEMALE

DRIVER ________ PRINT FULL NAME

DRIVER'S ADDRESS ________ STREET OR RFD ________ CITY AND STATE

DATE OF BIRTH ________ MO. DAY YEAR DRIVER'S LICENSE ________ STATE ________ NUMBER

OWNER ________ PRINT FULL NAME

OWNER'S ADDRESS ________ STREET OR RFD ________ CITY OR STATE

MAKE OF VEHICLE ________ TYPE ________ COUPE SEDAN TRUCK TAXI YEAR ________

ENGINE NUMBER ________ VEHICLE LICENSE ________ YEAR STATE NUMBER

DESCRIBE DAMAGE TO VEHICLE

APPROXIMATE COST TO REPAIR $

OTHER VEHICLE – No. 2 ☐ MALE ☐ FEMALE

DRIVER ________ PRINT FULL NAME

DRIVER'S ADDRESS ________ STREET OR RFD ________ CITY AND STATE

DATE OF BIRTH ________ MO. DAY YEAR DRIVER'S LICENSE ________ STATE ________ NUMBER

OWNER ________ PRINT FULL NAME

OWNER'S ADDRESS ________ STREET OR RFD ________ CITY AND STATE

MAKE OF VEHICLE ________ TYPE ________ COUPE SEDAN TRUCK TAXI YEAR ________

VEHICLE LICENSE PLATE ________ YEAR STATE NUMBER

DESCRIBE DAMAGE TO VEHICLE

How many vehicles were in the accident?

APPROXIMATE COST TO REPAIR $

USE ADDITIONAL REPORT FORM IF MORE THAN TWO VEHICLES

(Check) COLLISION WITH

- Other Motor Vehicle
- Pedestrian
- Railroad Train
- Street Car
- Bicycle
- Fixed Object
- Non-Collision

DAMAGE TO PROPERTY OTHER THAN VEHICLES ________ NAME OBJECT

COST TO REPAIR $

OWNER'S NAME AND ADDRESS

STUDENT WORKSHEET #45

PROBLEMS CREATED BY THE AUTOMOBILE

Today the greatest transporter of people is the automobile. Cars have created certain problems. Here are some of them:

1. We now need more and still more roads. We need wider roads and bridges. Each year additional farmland is covered with concrete and asphalt. As our population grows, we shall need more cropland for raising food.
2. Automobiles are clogging city streets. In the Metropolitan St. Louis area (especially during rush hour), the average speed of street traffic on working days is only about five miles per hour. This is scarcely faster than a man can walk!
3. Motor vehicles are a principal cause of air pollution. Fumes from automobile engines; especially during rush hours, when people are going to or from work; are not only unpleasant but a danger to health.
4. Automobile accidents kill one hundred Americans daily, injure more than 5,000 a day, and damage thousands of dollars worth of property.

Select one of these four problems and write a two-page essay stating some ideas that might lead to its solution. Here are a few thoughts that may help you:

A. People riding to work in packed buses don't take up nearly as much road space as those driving their own cars. Train passengers are off the road completely. Why do many people use cars when they could travel by bus or train?

B. Widening rural highways is easier than widening city streets. Why is this? Today broad new highways are funneling more and more cars into narrow old city streets. What is the result?

C. Years ago, when your grandparents were children, a few people drove around town in cars that burned no gasoline. These cars were powered by electric storage batteries. They could not go very fast, and their batteries had to be recharged often.

D. In a great many of our fatal automobile accidents, either the driver or the struck pedestrian has been drinking alcohol.

STUDENT WORKSHEET #46

A PROBLEM AND ITS SOLUTION ILLUSTRATED BY AN ART ACTIVITY

Divide a sheet of paper (17" by 22") in half. On one half prepare a sketch or collage portraying one problem caused by the automobile. On the other half of the paper prepare a sketch or collage (whatever you chose for the first half) showing a solution to the problem.

STUDENT WORKSHEET #47

THE EVER-CHANGING WORLD OF RAPID TRANSIT

Assignment:

Examine The Readers' Guide to Periodical Literature for articles on the various phases of Rapid Transit. (Suggestion: Look up "Rapid Transit" or "Transportation.")

After you have located an article, report on it using the form below:

Name of Article____

Name of Magazine____________________Date of Issue____________

What type of Rapid Transit was discussed in the article?____

____

____

Is this type of rapid transit now in existance or is it planned for the future?

____

What are the advantages of this form of rapid transit?______

____

____

____

What are the problems of this form of rapid transit?_________

____

____

____

Do you think you would use this form of rapid transit if it were available in the St. Louis Metropolitan Area? Why or Why not? ____

____

____

STUDENT WORKSHEET #48

DESIGNS FOR THE FUTURE

Rapid transit will someday become a reality in the St. Louis Metropolitan Area. Because of fierce competition with the automobile and other means of private transportation, it will be necessary for the rapid transit authority to maintain an image of progress.

Design one of the following items that will be needed by rapid transit planners in 1990:

1. terminal
2. a vehicle for rapid transit (either exterior or interior)
3. uniforms to be worn by drivers or stewardesses

(Your designs may be models that you make yourself or they may be done in sketch form)

STUDENT WORKSHEET #49

USING THE CAR COUNT TO GATHER DATA

Working in teams of two, make a 10 minute car count on the collector street of your subdivision at the following times:

1. 7:30 A.M. any weekday
2. 7:30 A.M. Saturday
3. 7:30 A.M. Sunday
4. 5:30 P.M. any weekday
5. 5:30 P.M. Saturday
6. 5:30 P.M. Sunday
7. 8:00 P.M. any weekday
8. 8:00 P.M. Saturday
9. 8:00 P.M. Sunday

Watch for the (1) number of cars passing; (2) number of cars with only family occupants (speculate); (3) number of cars with occupants obviously riding in pools.

Even though there are two of you working on these projects, the same area should be observed in order to establish reliable data.

When you accumulate your data, do the following:

1. Graph your findings for 1, 2, and 3 above. (Each on separate graphs)
2. How much are car pools being used in your neighborhood?

STUDENT WORKSHEET #50

SURVEYING THE NEED FOR CAR POOLS

Create a survey that will ask questions which will measure the following:

a. the number of persons now using car pools in your neighborhood
b. those interested in riding in a car pool if one existed
c. explain the Oakland Bridge idea, how many feel that this would work on Highway 40 (or any major thoroughfare in your area)
d. questions to be supplied by you

Now do the following:

1. survey 15 people
2. note if the person interviewed is the major breadwinner driving into the city or a housewife shopping
3. graph your results (by percentages)
4. list advantages and disadvantages that people gave you for car pools in the conversations you had

STUDENT WORKSHEET #51

FIELD TRIP TO LACLEDE GAS COMPANY

Take notes on the following questions:

1. Why is Laclede Gas Co. experimenting with C.N.G. fuel as an alternate to gasoline?

2. How is an automobile converted to compressed gas?

3. What are the advantages of operating on C.N.G.?

4. What are the disadvantages of using C.N.G.?

5. What controls are on the dash to inform the driver about the amount of gas in his tanks?

6. Are plans being made (or being considered) to convert busses to C.N.G.?

STUDENT WORKSHEET #52

NATURAL RESOURCES USED IN AUTOMOBILES

There are two activities to do in the chart below. In the column on the left, you are to list a natural resource (as, copper) which is used in the manufacture of automobiles. In the column on the right, you are to list how this resource is used in the automobile (as, electrical system).

Natural Resources	How Used in Automobile
1.	1.
2.	2.
3.	3.
4.	4.
5.	5.
6.	6.
7.	7.
8.	8.

Is No-Fault Auto Insurance the Answer?

Condensed from THE KIWANIS MAGAZINE

PAUL FRIGGENS

> Initial results of this revolutionary new concept are encouraging, but until national standards are set, the jury is out

OUR automobile insurance system has become an unconscionable mess. Though we're paying some $15 billion a year in premiums, and rates are skyrocketing, accident victims are getting back as little as 42 cents of each dollar expended for liability protection, and recovering only 20 percent of their actual economic losses. The big share of the premium dollar goes for agents' commissions, adjusters, lawyers' fees (lawyers pocket over $1 billion a year from auto litigation—about one quarter of their income) and the other enormous overhead expenses of insurance companies.

On top of this, some 200,000 auto accident cases a year now clog our courts; the average case doesn't come to trial for 16 months. Thousands settle out of court for far less than their real losses, or go bankrupt while they are hospitalized and out of work. Because in most states the insurance companies need pay for personal injury *only* if their insured driver is wholly blameless, a great many of today's victims never collect a dime. (Just try to prove who's to blame in a 15-car pileup on a foggy freeway!) Further, many insurance companies, blaming the soaring accident rate and claiming financial loss, are now arbitrarily canceling or refusing to renew policies for the aged and "high-risk" individuals.* In short, we now suffer from a scandalous system which, as the Philadelphia *Inquirer* says, "primarily insures grief, unfairness and expense."

One hopeful step toward alleviation of this distress is the revolutionary idea called no-fault auto insurance. Under its provisions, in case of accident, your insurance company will pay you—without delay—a *limited, basic* compensation for your actual medical expenses, lost wages and property damage *whether you were at fault or not.* (You are free to sue for additional damages.) No-fault may cover both bodily injury and property liability. Thus, when both areas are covered by no-fault, there is a guarantee of *some* payment for everybody involved in an automobile accident.

Massachusetts has now pioneered more than a year of limited no-fault for bodily injury, and last January extended the coverage to property damage. Florida, Illinois, Delaware and Oregon have also introduced varying forms of no-fault, while Minnesota and South Dakota offer an "optional" brand. Still other states are making studies or, like New York, considering legislation. Authorities predict that, with strong public support, most states will probably have adopted some form of no-fault within five years.

Recently, I visited Saskatchewan, Canada, where the first no-fault auto insurance began just over 25 years ago. There you obtain your owner's registration and compulsory no-fault policy at the same time—all on a credit-card-size form. For your premium, you get limited basic insurance: $5000 on the death of the major income earner, $2000 on the death of the spouse, and $1000 for each dependent child; $300 for funeral expenses; death benefits ranging from $100 to $1000 on each child (the amount set according to age); $25-a-week disability payments for up to 104 weeks; and $200 deductible for damage to your car. (You lose protection only for driving under the influence of alcohol, driving without a license or riding outside your vehicle.)

In addition, the state-owned company, the Saskatchewan Government Insurance Office (SGIO), pays up to $4000 for permanent bodily impairment, and up to $2000 for medical expenses, at which point Saskatchewan's socialized health care picks up the bill. (In a serious accident where the other driver is at fault and you seek additional compensation, you may sue.) Lastly, every motorist is protected with $35,000 in liability insurance; if he desires additional coverage, or to double his weekly benefits, he may buy extra insurance from the government or a private company. (About half of the drivers do buy extra coverage.) All told, the typical annual cost of basic no-fault in Saskatchewan, including extra coverage that brings the total liability up to $200,000, ranges from $110 to $135.

Just how does all this work in

---

*See "Why Insurance Is So Hard to Get," The Reader's Digest, April '71.

THE KIWANIS MAGAZINE (APRIL '72), © 1972 BY KIWANIS INTERNATIONAL, 101 E. ERIE ST., CHICAGO, ILL. 60611

practice? Here is one example:

Last summer, a carload of six joyriding teen-agers was hit by a train. Four were killed, two seriously injured. SGIO made no attempts to fix fault. In 60 days, without lengthy investigation or costly litigation, it paid $1000 in death benefits and $500 in funeral expenses for each of the victims, and nearly $2000 to each survivor for medical expenses—plus $3437 for loss of the car.

Saskatchewan covered 500,000 motorists in this manner from May 1969 through April 1970. "We paid out 82 cents in claim benefits for every premium dollar," says James Dutton, SGIO general manager. He accounts for this record largely by the fact that SGIO pays no agent commissions and that no-fault reduces litigation and speeds settlement.

One feature that citizens particularly like is the method of settling vehicle-damage claims. Say you've had a collision. You drive, or are towed, to the nearest claims service center, where adjusters pore over your car and hand you a firm estimate. Body-repair people are pretty sure to keep within such estimates. There are eight claims centers located in major cities and adjusters regularly visit remote rural sections.

Ten Canadian provinces have now adopted some form of no-fault, and a recent national survey by the Insurance Bureau of Canada shows popular support for the system. The government, the bar and the insurance industry also seem to approve. Yet, until recently, most big U.S. insurance companies, state legislators and trial lawyers vigorously opposed no-fault in this country. It was only after a long bitter battle that Massachusetts became, in 1971, the first state to put a limited form of no-fault into effect.

Overwhelmed with some 340,000 auto-accident claims a year, Massachusetts had the highest bodily-injury and property claim frequency in the United States—more than double the national average. In 1927, the Bay State had been the first in the nation to decree compulsory auto insurance. "Everyone knew that everyone else was insured," says Milton G. McDonald, chief actuary in the state's insurance department, "and people became very claim-conscious, filing inflated claims for alleged pain and suffering." Insurance rates soared to cover the "Massachusetts neck" or "Massachusetts back," and yet companies reported a $44-million loss between 1961 and 1971.

Faced with this shocking situation, the Massachusetts legislature passed limited no-fault, and cut premium rates a flat 15 percent. The law now requires the motorist's own insurance company to pay up to $2000 in bodily-injury claims, including medical expenses, regardless of fault—while granting the right to sue for higher losses—and to compensate for 75 percent of lost wages up to a total of $2000. Using a simple, standard form, the insured submits a medical claim to his insurance company, and is paid within 45 to 60 days. He must submit his employer's statement to collect lost wages; but if the bills are reasonable, no investigator is sent out and the whole claim is settled in 30 to 60 days.

Massachusetts Gov. Francis W. Sargent, state insurance commissioner John G. Ryan and insurance-industry spokesmen seem to agree that the no-fault plan is highly successful to date. It has speeded up cash settlement in about 90 percent of personal-injury cases, substantially reduced rates, stopped the inflated claims and effected surprising reform. In 1971, for example, Massachusetts reported 50,000 fewer personal injuries than in 1970—an astounding 35-percent drop—together with a 60-percent reduction in the cost of the average paid claim. Motorists are getting prompt settlements of $150 to $200 for claims that once cost insurance companies three or four times as much—mainly because the new law mandates that medical expenses must exceed $500 to enable a person to claim recovery for "pain and suffering." The state announced a further 27.6-percent cut in premium rates this year—altogether a whopping 42.6-percent reduction in two years.

Not everybody is happy. Authorities in the insurance field caution that the Massachusetts situation was extreme, and that other states may not necessarily be able to realize similar savings. Also, critics assail no-fault's limited benefits—calling them inadequate—and restrictions on the right to sue. Moreover, they charge that no-fault rewards the careless driver and, in most cases, fails to bring genuine reform to the auto-insurance industry. They point to the bewildering array of no-fault proposals now offered by a good part of the insurance industry, charging that much of it is sham reform cloaked in no-fault labels.

Meanwhile, there is legislation before Congress that would be vastly more liberal and far-reaching than present state statutes. This is the National No-Fault Motor Vehicle Insurance Act, co-sponsored by Senators Philip A. Hart (D., Mich.) and Warren G. Magnuson (D., Wash.). The Nixon Administration favors a national no-fault system that would provide reasonable medical benefits, plus income-loss benefits of up to $1000 a month for a maximum of three years. The right to sue would be restricted, but not abolished. Many thoughtful industry people and legislators agree that at the very least we ought to set federal standards for no-fault. The states would then be given two years in which to pass conforming legislation, or to comply with the federal guidelines.

With mounting slaughter and misery on our highways, it's inevitable that either Congress or the states must take steps to clean up our auto-insurance mess. From all the evidence, *meaningful* no-fault would appear to offer a hopeful remedy.

For information on reprints of this article, see page 24

◇◇◇◇◇◇◇◇◇

STUDENT WORKSHEET #53c

1. Why do some accident victims never collect anything from an insurance company.

2. Why are some accident victims only recovering as little as 20% of their actual economic loss?

3. What is the basic concept of no-fault insurance?

4. What are the reasons why a driver might lose protection of no-fault insurance in Saskatchewan, Canada? Should there be other reasons for the loss of this insurance?

5. What are some of the noticeable benefits of the Massachusetts no-fault insurance plan in its first year of operation?

6. On what basis do the opponents of no-fault insurance claim that it will not work?

STUDENT WORKSHEET #54

LETTER TO STATE REPRESENTATIVE

You are to write a letter to your representative in the Missouri State Legislature. In this letter you are to state if you favor or are opposed to a no-fault insurance plan for the automobile drivers of Missouri. In your letter, you should include:

1. your position on no-fault insurance.
2. your specific reasons for favoring or opposing a no-fault plan.
3. a request for pending legislation on no-fault insurance in the State Legislature.

STUDENT WORKSHEET #55

FIELD TRIP TO AUTOMOBILE MANUFACTURING PLANT

I. THE PLANT ITSELF

A. How large an area does the plant cover?

B. Why do automobile manufacturing plants such as this require such a large area?

C. How has the space been carefully utilized at the plant? (exp. is the plant multi-level?)

D. Is this plant located in a suitable area? Why?

E. Where does the plant get its power supply?

F. What comparison can you make concerning the use of power at the plant with the use of power in a city?

II. THE MANUFACTURING OPERATION

A. How many people are employed at the plant?

B. How many shifts manufacture automobiles?

C. What types of automobiles are manufactured at the plant? (e.g. cars, etc.)

D. How many of each type of automobile is manufactured per hour in the plant?

E. What stages of automobile production did you see?

III. YOUR OBSERVATIONS

A. List items, people, or operations you have seen on this tour that help justify the high cost of automobiles.

B. List some improvements you could make in the following areas:

1. physical plant

2. assembly plant operations

3. this tour

STUDENT WORKSHEET #56

A CAREER IN THE AUTOMOBILE INDUSTRY

If I chose a career in the automobile industry (or related field), I would choose:

Using the above topic sentence, write a two-page essay stating WHY you would make your particular choice. Also include the EDUCATION (years and type) you would need for this occupation.

STUDENT WORKSHEET #57

"THE AUTOMOBILE AND THE LIFE STYLE OF AMERICANS"

1. List some drive-in facilities in the Parkway area which perform services that could be performed in a way which did not necessitate the use of the automobile other than as a means of transportation?

2. What type of pollution problems are increased or intensified by the usage of such drive-in facilities?

3. What are the local ordinances with respect to the construction and operation of such drive-in facilities?